



## SEQUENCE LISTING

#4

<110> Collier, R. John  
Sellman, Brett R.

<120> Compounds and Methods for the Treatment  
and Prevention of Bacterial Infection

<130> 00742/060002

<140> US 09/848,909

<141> 2001-04-04

<150> US 60/201,800

<151> 2000-04-04

<160> 35

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 736

<212> PRT

<213> Bacillus anthracis

Sub  
C21

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Met	Val	Val	Thr	Ser	Ser	Thr	Thr	Gly	Asp	Leu	Ser	Ile	Pro	Ser	Ser
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Glu	Leu	Glu	Asn	Ile	Pro	Ser	Glu	Asn	Gln	Tyr	Phe	Gln	Ser	Ala	Ile
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Trp	Ser	Gly	Phe	Ile	Lys	Val	Lys	Lys	Ser	Asp	Glu	Tyr	Thr	Phe	Ala
65				70					75					80	
Thr	Ser	Ala	Asp	Asn	His	Val	Thr	Met	Trp	Val	Asp	Asp	Gln	Glu	Val
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Ile	Asn	Lys	Ala	Ser	Asn	Ser	Asn	Lys	Ile	Arg	Leu	Glu	Lys	Gly	Arg
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Leu	Tyr	Gln	Ile	Lys	Ile	Gln	Tyr	Gln	Arg	Glu	Asn	Pro	Thr	Glu	Lys
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Gly	Leu	Asp	Phe	Lys	Leu	Tyr	Trp	Thr	Asp	Ser	Gln	Asn	Lys	Lys	Glu
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Val	Ile	Ser	Ser	Asp	Asn	Leu	Gln	Leu	Pro	Glu	Leu	Lys	Gln	Lys	Ser
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Ser	Asn	Ser	Arg	Lys	Lys	Arg	Ser	Thr	Ser	Ala	Gly	Pro	Thr	Val	Pro
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Asp	Arg	Asp	Asn	Asp	Gly	Ile	Pro	Asp	Ser	Leu	Glu	Val	Glu	Gly	Tyr
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Thr	Val	Asp	Val	Lys	Asn	Lys	Arg	Thr	Phe	Leu	Ser	Pro	Trp	Ile	Ser
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Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu
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Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr
225					230					235				240	

Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
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 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
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 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
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 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
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 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile  
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 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
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 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
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 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
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 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
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 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
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 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
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 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
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 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
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 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
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 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
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 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
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 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
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Sub  
C2

Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
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 <212> PRT  
 <213> Bacillus anthracis

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 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
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 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
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 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
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 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
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 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
 290 295 300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
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 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
 340 345 350  
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365

Sub  
 C21

Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln  
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 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile  
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 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
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 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
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 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
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 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
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 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
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 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
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 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
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 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
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 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
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 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
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<210> 3

<211> 736

<212> PRT

<213> Bacillus-anthraxis

<400> 3

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Met	Val	Val	Thr	Ser	Ser	Thr	Thr	Gly	Asp	Leu	Ser	Ile	Pro	Ser	Ser		
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	50					55					60						
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Thr	Ser	Ala	Asp	Asn	His	Val	Thr	Met	Trp	Val	Asp	Asp	Gln	Glu	Val		
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Ile	Asn	Lys	Ala	Ser	Asn	Ser	Asn	Lys	Ile	Arg	Leu	Glu	Lys	Gly	Arg		
			100					105					110				
Leu	Tyr	Gln	Ile	Lys	Ile	Gln	Tyr	Gln	Arg	Glu	Asn	Pro	Thr	Glu	Lys		
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Gly	Leu	Asp	Phe	Lys	Leu	Tyr	Trp	Thr	Asp	Ser	Gln	Asn	Lys	Lys	Glu		
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Val	Ile	Ser	Ser	Asp	Asn	Leu	Gln	Leu	Pro	Glu	Leu	Lys	Gln	Lys	Ser		
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Ser	Asn	Ser	Arg	Lys	Lys	Arg	Ser	Thr	Ser	Ala	Gly	Pro	Thr	Val	Pro		
				165					170					175			
Asp	Arg	Asp	Asn	Asp	Gly	Ile	Pro	Asp	Ser	Leu	Glu	Val	Glu	Gly	Tyr		
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Thr	Val	Asp	Val	Lys	Asn	Lys	Arg	Thr	Phe	Leu	Ser	Pro	Trp	Ile	Ser		
	195						200					205					
Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu		
	210					215					220						
Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr		
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Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val		
				245					250					255			
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser		
			260					265					270				
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Glu	Thr	Arg	Thr		
	275						280					285					
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His		
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Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val		
305					310					315					320		
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His		
				325					330					335			
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu		
			340					345					350				
Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn		
	355						360					365					
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val		
	370					375					380						
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln		
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Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu		
				405					410					415			
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Phe	Ser	Ser	Thr	Pro	Ile			
			420					425					430				
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu		
		435					440					445					
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe		
	450					455					460						
Glu	Asn	Gly	Arg	Val	Arg	Val	Asp	Thr	Gly	Ser	Asn	Trp	Ser	Glu	Val		
465					470					475					480		
Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys		
				485					490					495			

Asp	Leu	Asn	Leu	Val	Glu	Arg	Arg	Ile	Ala	Ala	Val	Asn	Pro	Ser	Asp	500	505	510
Pro	Leu	Glu	Thr	Thr	Lys	Pro	Asp	Met	Thr	Leu	Lys	Glu	Ala	Leu	Lys	515	520	525
Ile	Ala	Phe	Gly	Phe	Asn	Glu	Pro	Asn	Gly	Asn	Leu	Gln	Tyr	Gln	Gly	530	535	540
Lys	Asp	Ile	Thr	Glu	Phe	Asp	Phe	Asn	Phe	Asp	Gln	Gln	Thr	Ser	Gln	545	550	555
Asn	Ile	Lys	Asn	Gln	Leu	Ala	Glu	Leu	Asn	Ala	Thr	Asn	Ile	Tyr	Thr	565	570	575
Val	Leu	Asp	Lys	Ile	Lys	Leu	Asn	Ala	Lys	Met	Asn	Ile	Leu	Ile	Arg	580	585	590
Asp	Lys	Arg	Phe	His	Tyr	Asp	Arg	Asn	Asn	Ile	Ala	Val	Gly	Ala	Asp	595	600	605
Glu	Ser	Val	Val	Lys	Glu	Ala	His	Arg	Glu	Val	Ile	Asn	Ser	Ser	Thr	610	615	620
Glu	Gly	Leu	Leu	Leu	Asn	Ile	Asp	Lys	Asp	Ile	Arg	Lys	Ile	Leu	Ser	625	630	635
Gly	Tyr	Ile	Val	Glu	Ile	Glu	Asp	Thr	Glu	Gly	Leu	Lys	Glu	Val	Ile	645	650	655
Asn	Asp	Arg	Tyr	Asp	Met	Leu	Asn	Ile	Ser	Ser	Leu	Arg	Gln	Asp	Gly	660	665	670
Lys	Thr	Phe	Ile	Asp	Phe	Lys	Lys	Tyr	Asn	Asp	Lys	Leu	Pro	Leu	Tyr	675	680	685
Ile	Ser	Asn	Pro	Asn	Tyr	Lys	Val	Asn	Val	Tyr	Ala	Val	Thr	Lys	Glu	690	695	700
Asn	Thr	Ile	Ile	Asn	Pro	Ser	Glu	Asn	Gly	Asp	Thr	Ser	Thr	Asn	Gly	705	710	715
Ile	Lys	Lys	Ile	Leu	Ile	Phe	Ser	Lys	Lys	Gly	Tyr	Glu	Ile	Gly	Glx	725	730	735

<210> 4

<211> 736

<212> PRT

<213> Bacillus anthracis

<400> 4

Glu	Val	Lys	Gln	Glu	Asn	Arg	Leu	Leu	Asn	Glu	Ser	Glu	Ser	Ser	Ser	1	5	10	15
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Met	Val	Val	Thr	Ser	Ser	Thr	Thr	Gly	Asp	Leu	Ser	Ile	Pro	Ser	Ser	40	45	50	55
Glu	Leu	Glu	Asn	Ile	Pro	Ser	Glu	Asn	Gln	Tyr	Phe	Gln	Ser	Ala	Ile	60	65	70	75
Trp	Ser	Gly	Phe	Ile	Lys	Val	Lys	Lys	Ser	Asp	Glu	Tyr	Thr	Phe	Ala	80	85	90	95
Thr	Ser	Ala	Asp	Asn	His	Val	Thr	Met	Trp	Val	Asp	Asp	Gln	Glu	Val	100	105	110	115
Ile	Asn	Lys	Ala	Ser	Asn	Ser	Asn	Lys	Ile	Arg	Leu	Glu	Lys	Gly	Arg	120	125	130	135
Leu	Tyr	Gln	Ile	Lys	Ile	Gln	Tyr	Gln	Arg	Glu	Asn	Pro	Thr	Glu	Lys	140	145	150	155
Gly	Leu	Asp	Phe	Lys	Leu	Tyr	Trp	Thr	Asp	Ser	Gln	Asn	Lys	Lys	Glu	160	165	170	175
Val	Ile	Ser	Ser	Asp	Asn	Leu	Gln	Leu	Pro	Glu	Leu	Lys	Gln	Lys	Ser	180	185	190	195



Glu	Gly	Leu	Leu	Leu	Asn	Ile	Asp	Lys	Asp	Ile	Arg	Lys	Ile	Leu	Ser
625					630					635					640
Gly	Tyr	Ile	Val	Glu	Ile	Glu	Asp	Thr	Glu	Gly	Leu	Lys	Glu	Val	Ile
				645					650						655
Asn	Asp	Arg	Tyr	Asp	Met	Leu	Asn	Ile	Ser	Ser	Leu	Arg	Gln	Asp	Gly
			660					665					670		
Lys	Thr	Phe	Ile	Asp	Phe	Lys	Lys	Tyr	Asn	Asp	Lys	Leu	Pro	Leu	Tyr
		675					680					685			
Ile	Ser	Asn	Pro	Asn	Tyr	Lys	Val	Asn	Val	Tyr	Ala	Val	Thr	Lys	Glu
	690					695					700				
Asn	Thr	Ile	Ile	Asn	Pro	Ser	Glu	Asn	Gly	Asp	Thr	Ser	Thr	Asn	Gly
705					710					715					720
Ile	Lys	Lys	Ile	Leu	Ile	Phe	Ser	Lys	Lys	Gly	Tyr	Glu	Ile	Gly	Glx
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<210> 5  
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 <212> PRT  
 <213> Bacillus anthracis

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Gln	Gly	Leu	Leu	Gly	Tyr	Tyr	Phe	Ser	Asp	Leu	Asn	Phe	Gln	Ala	Pro
			20					25					30		
Met	Val	Val	Thr	Ser	Ser	Thr	Thr	Gly	Asp	Leu	Ser	Ile	Pro	Ser	Ser
		35					40					45			
Glu	Leu	Glu	Asn	Ile	Pro	Ser	Glu	Asn	Gln	Tyr	Phe	Gln	Ser	Ala	Ile
	50					55					60				
Trp	Ser	Gly	Phe	Ile	Lys	Val	Lys	Lys	Ser	Asp	Glu	Tyr	Thr	Phe	Ala
65					70					75					80
Thr	Ser	Ala	Asp	Asn	His	Val	Thr	Met	Trp	Val	Asp	Asp	Gln	Glu	Val
			85						90					95	
Ile	Asn	Lys	Ala	Ser	Asn	Ser	Asn	Lys	Ile	Arg	Leu	Glu	Lys	Gly	Arg
			100					105					110		
Leu	Tyr	Gln	Ile	Lys	Ile	Gln	Tyr	Gln	Arg	Glu	Asn	Pro	Thr	Glu	Lys
		115					120					125			
Gly	Leu	Asp	Phe	Lys	Leu	Tyr	Trp	Thr	Asp	Ser	Gln	Asn	Lys	Lys	Glu
	130					135					140				
Val	Ile	Ser	Ser	Asp	Asn	Leu	Gln	Leu	Pro	Glu	Leu	Lys	Gln	Lys	Ser
145					150					155					160
Ser	Asn	Ser	Arg	Lys	Lys	Arg	Ser	Thr	Ser	Ala	Gly	Pro	Thr	Val	Pro
			165						170					175	
Asp	Arg	Asp	Asn	Asp	Gly	Ile	Pro	Asp	Ser	Leu	Glu	Val	Glu	Gly	Tyr
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Thr	Val	Asp	Val	Lys	Asn	Lys	Arg	Thr	Phe	Leu	Ser	Pro	Trp	Ile	Ser
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Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu
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Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr
225					230					235					240
Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val
				245					250					255	
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser
			260					265					270		
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Glu	Thr	Arg	Thr
		275					280					285			



Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His
290						295					300				
Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val
305					310					315					320
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His
				325						330					335
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu
			340					345					350		
Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn
		355					360					365			
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val
	370					375					380				
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln
385					390					395					400
Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Pro	Ser	Lys	Asn	Leu	
				405					410					415	
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Asp	Phe	Ser	Ser	Thr	Pro	Ile
			420					425						430	
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu
		435					440					445			
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe
	450					455					460				
Glu	Asn	Gly	Arg	Val	Arg	Val	Asp	Thr	Gly	Ser	Asn	Trp	Ser	Glu	Val
465					470					475					480
Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys
				485					490					495	
Asp	Leu	Asn	Leu	Val	Glu	Arg	Arg	Ile	Ala	Ala	Val	Asn	Pro	Ser	Asp
			500					505					510		
Pro	Leu	Glu	Thr	Thr	Lys	Pro	Asp	Met	Thr	Leu	Lys	Glu	Ala	Leu	Lys
		515					520					525			
Ile	Ala	Phe	Gly	Phe	Asn	Glu	Pro	Asn	Gly	Asn	Leu	Gln	Tyr	Gln	Gly
	530					535					540				
Lys	Asp	Ile	Thr	Glu	Phe	Asp	Phe	Asn	Phe	Asp	Gln	Gln	Thr	Ser	Gln
545					550					555					560
Asn	Ile	Lys	Asn	Gln	Leu	Ala	Glu	Leu	Asn	Ala	Thr	Asn	Ile	Tyr	Thr
				565					570					575	
Val	Leu	Asp	Lys	Ile	Lys	Leu	Asn	Ala	Lys	Met	Asn	Ile	Leu	Ile	Arg
			580					585					590		
Asp	Lys	Arg	Phe	His	Tyr	Asp	Arg	Asn	Asn	Ile	Ala	Val	Gly	Ala	Asp
		595					600					605			
Glu	Ser	Val	Val	Lys	Glu	Ala	His	Arg	Glu	Val	Ile	Asn	Ser	Ser	Thr
	610					615					620				
Glu	Gly	Leu	Leu	Leu	Asn	Ile	Asp	Lys	Asp	Ile	Arg	Lys	Ile	Leu	Ser
625					630					635					640
Gly	Tyr	Ile	Val	Glu	Ile	Glu	Asp	Thr	Glu	Gly	Leu	Lys	Glu	Val	Ile
				645					650					655	
Asn	Asp	Arg	Tyr	Asp	Met	Leu	Asn	Ile	Ser	Ser	Leu	Arg	Gln	Asp	Gly
			660					665					670		
Lys	Thr	Phe	Ile	Asp	Phe	Lys	Lys	Tyr	Asn	Asp	Lys	Leu	Pro	Leu	Tyr
		675					680					685			
Ile	Ser	Asn	Pro	Asn	Tyr	Lys	Val	Asn	Val	Tyr	Ala	Val	Thr	Lys	Glu
	690					695					700				
Asn	Thr	Ile	Ile	Asn	Pro	Ser	Glu	Asn	Gly	Asp	Thr	Ser	Thr	Asn	Gly
705					710					715					720
Ile	Lys	Lys	Ile	Leu	Ile	Phe	Ser	Lys	Lys	Gly	Tyr	Glu	Ile	Gly	Glx
				725						730				735	

<210> 6  
 <211> 736  
 <212> PRT  
 <213> Bacillus anthracis

<400> 6  
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 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
 20 25 30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
 290 295 300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
 305 310 315 320  
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
 340 345 350  
~~Asn-Thr-Ala-Asp-Thr-Ala-Arg-Leu Asn Ala Asn Ile Arg Tyr Val Asn~~  
~~355 360 365~~  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415





Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly Glx  
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<210> 8

<211> 736

<212> PRT

<213> Bacillus anthracis

<400> 8

Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
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 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
 20 25 30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205

Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu		
210						215					220						
Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr		
225						230				235					240		
Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val		
				245					250					255			
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser		
			260					265					270				
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Glu	Thr	Arg	Thr		
		275					280					285					
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His		
	290					295				300							
Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val		
305					310					315					320		
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His		
				325					330					335			
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu		
			340					345					350				
Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn		
	355					360						365					
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val		
	370				375						380						
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln		
385				390						395					400		
Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu		
				405					410					415			
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Asp	Phe	Ser	Ser	Thr	Pro	Ile		
			420					425					430				
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu		
	435					440						445					
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe		
	450					455				460							
Glu	Asn	Gly	Arg	Val	Arg	Val	Asp	Thr	Gly	Ser	Asn	Trp	Ser	Glu	Val		
465				470						475				480			
Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys		
				485					490					495			
Asp	Leu	Asn	Leu	Val	Glu	Arg	Arg	Ile	Ala	Ala	Val	Asn	Pro	Ser	Asp		
			500					505					510				
Pro	Leu	Glu	Thr	Thr	Lys	Pro	Asp	Met	Thr	Leu	Lys	Glu	Ala	Leu	Lys		
	515						520					525					
Ile	Ala	Phe	Gly	Phe	Asn	Glu	Pro	Asn	Gly	Asn	Leu	Gln	Tyr	Gln	Gly		
	530				535					540							
Lys	Asp	Ile	Thr	Glu	Phe	Asp	Phe	Asn	Phe	Asp	Gln	Gln	Thr	Ser	Gln		
545				550						555				560			
Asn	Ile	Lys	Asn	Gln	Leu	Ala	Glu	Leu	Asn	Ala	Thr	Asn	Ile	Tyr	Thr		
				565					570					575			
Val	Leu	Asp	Lys	Ile	Lys	Leu	Asn	Ala	Lys	Met	Asn	Ile	Leu	Ile	Arg		
			580					585					590				
Asp	Lys	Arg	Phe	His	Tyr	Asp	Arg	Asn	Asn	Ile	Ala	Val	Gly	Ala	Asp		
		595				600					605						
Glu	Ser	Val	Val	Lys	Glu	Ala	His	Arg	Glu	Val	Ile	Asn	Ser	Ser	Thr		
	610					615					620						
Glu	Gly	Leu	Leu	Leu	Asn	Ile	Asp	Lys	Asp	Ile	Arg	Lys	Ile	Leu	Ser		
625				630						635				640			
Gly	Tyr	Ile	Val	Glu	Ile	Glu	Asp	Thr	Glu	Gly	Leu	Lys	Glu	Val	Ile		
				645					650					655			
Asn	Asp	Arg	Tyr	Asp	Met	Leu	Asn	Ile	Ser	Ser	Leu	Arg	Gln	Asp	Gly		
			660					665					670				

Lys	Thr	Phe	Ile	Asp	Phe	Lys	Lys	Tyr	Asn	Asp	Lys	Leu	Pro	Leu	Tyr
		675					680					685			
Ile	Ser	Asn	Pro	Asn	Tyr	Lys	Val	Asn	Val	Tyr	Ala	Val	Thr	Lys	Glu
		690				695					700				
Asn	Thr	Ile	Ile	Asn	Pro	Ser	Glu	Asn	Gly	Asp	Thr	Ser	Thr	Asn	Gly
705					710					715					720
Ile	Lys	Lys	Ile	Leu	Ile	Phe	Ser	Lys	Lys	Gly	Tyr	Glu	Ile	Gly	Glx
				725					730					735	

<210> 9

<211> 736

<212> PRT

<213> Bacillus anthracis

<400> 9

Glu	Val	Lys	Gln	Glu	Asn	Arg	Leu	Leu	Asn	Glu	Ser	Glu	Ser	Ser	Ser
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Gln	Gly	Leu	Leu	Gly	Tyr	Tyr	Phe	Ser	Asp	Leu	Asn	Phe	Gln	Ala	Pro
		20						25					30		
Met	Val	Val	Thr	Ser	Ser	Thr	Thr	Gly	Asp	Leu	Ser	Ile	Pro	Ser	Ser
		35					40					45			
Glu	Leu	Glu	Asn	Ile	Pro	Ser	Glu	Asn	Gln	Tyr	Phe	Gln	Ser	Ala	Ile
		50				55					60				
Trp	Ser	Gly	Phe	Ile	Lys	Val	Lys	Lys	Ser	Asp	Glu	Tyr	Thr	Phe	Ala
65					70					75					80
Thr	Ser	Ala	Asp	Asn	His	Val	Thr	Met	Trp	Val	Asp	Asp	Gln	Glu	Val
				85					90					95	
Ile	Asn	Lys	Ala	Ser	Asn	Ser	Asn	Lys	Ile	Arg	Leu	Glu	Lys	Gly	Arg
			100					105					110		
Leu	Tyr	Gln	Ile	Lys	Ile	Gln	Tyr	Gln	Arg	Glu	Asn	Pro	Thr	Glu	Lys
		115					120					125			
Gly	Leu	Asp	Phe	Lys	Leu	Tyr	Trp	Thr	Asp	Ser	Gln	Asn	Lys	Lys	Glu
		130				135					140				
Val	Ile	Ser	Ser	Asp	Asn	Leu	Gln	Leu	Pro	Glu	Leu	Lys	Gln	Lys	Ser
145					150					155					160
Ser	Asn	Ser	Arg	Lys	Lys	Arg	Ser	Thr	Ser	Ala	Gly	Pro	Thr	Val	Pro
				165					170					175	
Asp	Arg	Asp	Asn	Asp	Gly	Ile	Pro	Asp	Ser	Leu	Glu	Val	Glu	Gly	Tyr
			180					185					190		
Thr	Val	Asp	Val	Lys	Asn	Lys	Arg	Thr	Phe	Leu	Ser	Pro	Trp	Ile	Ser
		195					200						205		
Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu
		210				215					220				
Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr
225					230					235					240
Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val
				245					250					255	
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser
			260					265					270		
<del>Lys</del>	<del>Asn</del>	<del>Glu</del>	<del>Asp</del>	<del>Gln</del>	<del>Ser</del>	<del>Thr</del>	<del>Gln</del>	<del>Asn</del>	<del>Thr</del>	<del>Asp</del>	<del>Ser</del>	<del>Glu</del>	<del>Thr</del>	<del>Arg</del>	<del>Thr</del>
			275				280					285			
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His
		290				295					300				
Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val
305					310					315					320
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His
				325					330					335	

Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu
			340						345				350		
Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn
		355					360					365			
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val
		370				375					380				
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln
385				390						395				400	
Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu
			405						410				415		
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Asp	Phe	Ser	Ser	Thr	Pro	Ile
			420					425					430		
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu
		435				440						445			
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe
	450				455						460				
Glu	Asn	Gly	Arg	Val	Arg	Val	Asp	Thr	Gly	Ser	Asn	Trp	Ser	Glu	Val
465				470					475					480	
Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys
			485					490					495		
Asp	Leu	Asn	Leu	Val	Glu	Arg	Arg	Ile	Ala	Ala	Val	Asn	Pro	Ser	Asp
		500						505					510		
Pro	Leu	Glu	Thr	Thr	Lys	Pro	Asp	Met	Thr	Leu	Lys	Glu	Ala	Leu	Lys
	515					520						525			
Ile	Ala	Phe	Gly	Phe	Asn	Glu	Pro	Asn	Gly	Asn	Leu	Gln	Tyr	Gln	Gly
	530				535						540				
Lys	Asp	Ile	Thr	Glu	Phe	Asp	Phe	Asn	Phe	Asp	Gln	Gln	Thr	Ser	Gln
545				550					555						560
Asn	Ile	Lys	Asn	Gln	Leu	Ala	Glu	Leu	Asn	Ala	Thr	Asn	Ile	Tyr	Thr
			565					570					575		
Val	Leu	Asp	Lys	Ile	Lys	Leu	Asn	Ala	Lys	Met	Asn	Ile	Leu	Ile	Arg
		580					585					590			
Asp	Lys	Arg	Phe	His	Tyr	Asp	Arg	Asn	Asn	Ile	Ala	Val	Gly	Ala	Asp
	595					600					605				
Glu	Ser	Val	Val	Lys	Glu	Ala	His	Arg	Glu	Val	Ile	Asn	Ser	Ser	Thr
	610				615						620				
Glu	Gly	Leu	Leu	Leu	Asn	Ile	Asp	Lys	Asp	Ile	Arg	Lys	Ile	Leu	Ser
625				630					635					640	
Gly	Tyr	Ile	Val	Glu	Ile	Glu	Asp	Thr	Glu	Gly	Leu	Lys	Glu	Val	Ile
			645					650					655		
Asn	Asp	Arg	Tyr	Asp	Met	Leu	Asn	Ile	Ser	Ser	Leu	Arg	Gln	Asp	Gly
		660					665					670			
Lys	Thr	Phe	Ile	Asp	Phe	Lys	Lys	Tyr	Asn	Asp	Lys	Leu	Pro	Leu	Tyr
	675					680					685				
Ile	Ser	Asn	Pro	Asn	Tyr	Lys	Val	Asn	Val	Tyr	Ala	Val	Thr	Lys	Glu
	690				695					700					
Asn	Thr	Ile	Ile	Asn	Pro	Ser	Glu	Asn	Gly	Asp	Thr	Ser	Thr	Asn	Gly
705				710					715					720	
Ile	Lys	Lys	Ile	Leu	Ile	Phe	Ser	Lys	Lys	Gly	Tyr	Glu	Ile	Gly	Glx
			725					730					735		

<210> 10  
 <211> 736  
 <212> PRT  
 <213> Bacillus anthracis

<400> 10



Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
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 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
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 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
 290 295 300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
 305 310 315 320  
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
 340 345 350  
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Phe Ser Ser Thr Pro Ile  
 420 425 430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
 435 440 445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460

Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly Glx  
 725 730 735

<210> 11  
 <211> 736  
 <212> PRT  
 <213> Bacillus anthracis

<400> 11  
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
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 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
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 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125

Gly	Leu	Asp	Phe	Lys	Leu	Tyr	Trp	Thr	Asp	Ser	Gln	Asn	Lys	Lys	Glu
	130					135					140				
Val	Ile	Ser	Ser	Asp	Asn	Leu	Gln	Leu	Pro	Glu	Leu	Lys	Gln	Lys	Ser
145					150					155					160
Ser	Asn	Ser	Arg	Lys	Lys	Arg	Ser	Thr	Ser	Ala	Gly	Pro	Thr	Val	Pro
				165					170					175	
Asp	Arg	Asp	Asn	Asp	Gly	Ile	Pro	Asp	Ser	Leu	Glu	Val	Glu	Gly	Tyr
		180						185					190		
Thr	Val	Asp	Val	Lys	Asn	Lys	Arg	Thr	Phe	Leu	Ser	Pro	Trp	Ile	Ser
	195						200					205			
Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu
	210					215					220				
Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr
225					230					235					240
Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val
				245					250					255	
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser
		260						265					270		
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Glu	Thr	Arg	Thr
	275						280					285			
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His
	290					295					300				
Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val
305					310					315					320
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His
				325					330					335	
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu
		340						345					350		
Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn
	355					360						365			
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val
	370					375					380				
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln
385					390					395					400
Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu
				405					410					415	
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Asp	Phe	Ser	Ser	Thr	Pro	Ile
		420						425					430		
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu
	435					440						445			
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe
	450					455				460					
Glu	Asn	Gly	Arg	Val	Arg	Val	Asp	Thr	Gly	Ser	Asn	Trp	Ser	Glu	Val
465					470					475					480
Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys
				485					490					495	
Asp	Leu	Asn	Leu	Val	Glu	Arg	Arg	Ile	Ala	Ala	Val	Asn	Pro	Ser	Asp
		500						505					510		
Pro	Leu	Glu	Thr	Thr	Lys	Pro	Asp	Met	Thr	Leu	Lys	Glu	Ala	Leu	Lys
	515						520					525			
<del>Ile</del>	<del>Ala</del>	<del>Phe</del>	<del>Gly</del>	<del>Phe</del>	<del>Asn</del>	<del>Glu</del>	<del>Pro</del>	<del>Asn</del>	<del>Gly</del>	<del>Asn</del>	<del>Leu</del>	<del>Gln</del>	<del>Tyr</del>	<del>Gln</del>	<del>Gly</del>
	530					535					540				
Lys	Asp	Ile	Thr	Glu	Phe	Asp	Phe	Asn	Phe	Asp	Gln	Gln	Thr	Ser	Gln
545					550					555					560
Asn	Ile	Lys	Asn	Gln	Leu	Ala	Glu	Leu	Asn	Ala	Thr	Asn	Ile	Tyr	Thr
				565					570					575	
Val	Leu	Asp	Lys	Ile	Lys	Leu	Asn	Ala	Lys	Met	Asn	Ile	Leu	Ile	Arg
			580					585					590		

Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly Glx  
 725 730 735

<210> 12

<211> 736

<212> PRT

<213> Bacillus anthracis

<400> 12

Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
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 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
 20 25 30  
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
~~Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser~~  
~~195 200 205~~  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255



Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly Glx  
725 730 735

<210> 13  
<211> 736  
<212> PRT  
<213> Bacillus anthracis

<400> 13  
Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
1 5 10 15  
Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
20 25 30  
Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
35 40 45  
Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
50 55 60  
Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
65 70 75 80  
Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
85 90 95  
Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
100 105 110  
Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
115 120 125  
Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
130 135 140  
Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
145 150 155 160  
Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
165 170 175  
Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
180 185 190  
Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
195 200 205  
Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
210 215 220  
Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
225 230 235 240  
Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
245 250 255  
Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
260 265 270  
Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
275 280 285  
Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
290 295 300  
Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
305 310 315 320  
Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
325 330 335  
Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
340 345 350  
Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
355 360 365  
Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
370 375 380

Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln	385	390	395	400
Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu	405	410	415	
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Asp	Phe	Ser	Ser	Thr	Pro	Ile	420	425	430	
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu	435	440	445	
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe	450	455	460	
Glu	Asn	Gly	Arg	Val	Arg	Val	Asp	Thr	Gly	Ser	Asn	Trp	Ser	Glu	Val	465	470	475	480
Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys	485	490	495	
Asp	Leu	Asn	Leu	Val	Glu	Arg	Arg	Ile	Ala	Ala	Val	Asn	Pro	Ser	Asp	500	505	510	
Pro	Leu	Glu	Thr	Thr	Lys	Pro	Asp	Met	Thr	Leu	Lys	Glu	Ala	Leu	Lys	515	520	525	
Ile	Ala	Phe	Gly	Phe	Asn	Glu	Pro	Asn	Gly	Asn	Leu	Gln	Tyr	Gln	Gly	530	535	540	
Lys	Asp	Ile	Thr	Glu	Phe	Asp	Phe	Asn	Phe	Asp	Gln	Gln	Thr	Ser	Gln	545	550	555	560
Asn	Ile	Lys	Asn	Gln	Leu	Ala	Glu	Leu	Asn	Ala	Thr	Asn	Ile	Tyr	Thr	565	570	575	
Val	Leu	Asp	Lys	Ile	Lys	Leu	Asn	Ala	Lys	Met	Asn	Ile	Leu	Ile	Arg	580	585	590	
Asp	Lys	Arg	Phe	His	Tyr	Asp	Arg	Asn	Asn	Ile	Ala	Val	Gly	Ala	Asp	595	600	605	
Glu	Ser	Val	Val	Lys	Glu	Ala	His	Arg	Glu	Val	Ile	Asn	Ser	Ser	Thr	610	615	620	
Glu	Gly	Leu	Leu	Leu	Asn	Ile	Asp	Lys	Asp	Ile	Arg	Lys	Ile	Leu	Ser	625	630	635	640
Gly	Tyr	Ile	Val	Glu	Ile	Glu	Asp	Thr	Glu	Gly	Leu	Lys	Glu	Val	Ile	645	650	655	
Asn	Asp	Arg	Tyr	Asp	Met	Leu	Asn	Ile	Ser	Ser	Leu	Arg	Gln	Asp	Gly	660	665	670	
Lys	Thr	Phe	Ile	Asp	Phe	Lys	Lys	Tyr	Asn	Asp	Lys	Leu	Pro	Leu	Tyr	675	680	685	
Ile	Ser	Asn	Pro	Asn	Tyr	Lys	Val	Asn	Val	Tyr	Ala	Val	Thr	Lys	Glu	690	695	700	
Asn	Thr	Ile	Ile	Asn	Pro	Ser	Glu	Asn	Gly	Asp	Thr	Ser	Thr	Asn	Gly	705	710	715	720
Ile	Lys	Lys	Ile	Leu	Ile	Phe	Ser	Lys	Lys	Gly	Tyr	Glu	Ile	Gly	Glx	725	730	735	

<210> 14  
 <211> 736  
 <212> PRT  
 <213> Bacillus anthracis

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<400> 14																			
Glu	Val	Lys	Gln	Glu	Asn	Arg	Leu	Leu	Asn	Glu	Ser	Glu	Ser	Ser	Ser	1	5	10	15
Gln	Gly	Leu	Leu	Gly	Tyr	Tyr	Phe	Ser	Asp	Leu	Asn	Phe	Gln	Ala	Pro	20	25	30	
Met	Val	Val	Thr	Ser	Ser	Thr	Thr	Gly	Asp	Leu	Ser	Ile	Pro	Ser	Ser	35	40	45	

Glu	Leu	Glu	Asn	Ile	Pro	Ser	Glu	Asn	Gln	Tyr	Phe	Gln	Ser	Ala	Ile
50						55					60				
Trp	Ser	Gly	Phe	Ile	Lys	Val	Lys	Lys	Ser	Asp	Glu	Tyr	Thr	Phe	Ala
65					70					75					80
Thr	Ser	Ala	Asp	Asn	His	Val	Thr	Met	Trp	Val	Asp	Asp	Gln	Glu	Val
				85					90					95	
Ile	Asn	Lys	Ala	Ser	Asn	Ser	Asn	Lys	Ile	Arg	Leu	Glu	Lys	Gly	Arg
			100					105					110		
Leu	Tyr	Gln	Ile	Lys	Ile	Gln	Tyr	Gln	Arg	Glu	Asn	Pro	Thr	Glu	Lys
		115					120					125			
Gly	Leu	Asp	Phe	Lys	Leu	Tyr	Trp	Thr	Asp	Ser	Gln	Asn	Lys	Lys	Glu
	130					135					140				
Val	Ile	Ser	Ser	Asp	Asn	Leu	Gln	Leu	Pro	Glu	Leu	Lys	Gln	Lys	Ser
145					150					155					160
Ser	Asn	Ser	Arg	Lys	Lys	Arg	Ser	Thr	Ser	Ala	Gly	Pro	Thr	Val	Pro
				165					170					175	
Asp	Arg	Asp	Asn	Asp	Gly	Ile	Pro	Asp	Ser	Leu	Glu	Val	Glu	Gly	Tyr
			180					185					190		
Thr	Val	Asp	Val	Lys	Asn	Lys	Arg	Thr	Phe	Leu	Ser	Pro	Trp	Ile	Ser
		195					200					205			
Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu
	210					215						220			
Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr
225					230					235					240
Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val
				245					250					255	
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser
			260					265					270		
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Glu	Thr	Arg	Thr
		275					280					285			
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His
	290					295					300				
Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val
305					310					315					320
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His
				325					330					335	
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu
			340					345					350		
Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn
		355					360					365			
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val
	370					375						380			
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln
385					390					395					400
Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu
				405					410					415	
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Phe	Ser	Ser	Thr	Pro	Ile	
			420					425					430		
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu
		435					440					445			
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe
	450					455					460				
Glu	Asn	Gly	Arg	Val	Arg	Val	Asp	Thr	Gly	Ser	Asn	Trp	Ser	Glu	Val
465					470					475					480
Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys
				485					490					495	
Asp	Leu	Asn	Leu	Val	Glu	Arg	Arg	Ile	Ala	Ala	Val	Asn	Pro	Ser	Asp
			500					505					510		



Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly Glx  
 725 730 735

<210> 15

<211> 736

<212> PRT

<213> Bacillus anthracis

<400> 15

Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
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 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
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 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175

Asp	Arg	Asp	Asn	Asp	Gly	Ile	Pro	Asp	Ser	Leu	Glu	Val	Glu	Gly	Tyr	180	185	190
Thr	Val	Asp	Val	Lys	Asn	Lys	Arg	Thr	Phe	Leu	Ser	Pro	Trp	Ile	Ser	195	200	205
Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu	210	215	220
Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr	225	230	235
Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val	245	250	255
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser	260	265	270
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Glu	Thr	Arg	Thr	275	280	285
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His	290	295	300
Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val	305	310	315
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His	325	330	335
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu	340	345	350
Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn	355	360	365
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val	370	375	380
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln	385	390	395
Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu	405	410	415
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Asp	Phe	Ser	Ser	Thr	Pro	Ile	420	425	430
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu	435	440	445
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe	450	455	460
Glu	Asn	Gly	Arg	Val	Arg	Val	Asp	Thr	Gly	Ser	Asn	Trp	Ser	Glu	Val	465	470	475
Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys	485	490	495
Asp	Leu	Asn	Leu	Val	Glu	Arg	Arg	Ile	Ala	Ala	Val	Asn	Pro	Ser	Asp	500	505	510
Pro	Leu	Glu	Thr	Thr	Lys	Pro	Asp	Met	Thr	Leu	Lys	Glu	Ala	Leu	Lys	515	520	525
Ile	Ala	Phe	Gly	Phe	Asn	Glu	Pro	Asn	Gly	Asn	Leu	Gln	Tyr	Gln	Gly	530	535	540
Lys	Asp	Ile	Thr	Glu	Phe	Asp	Phe	Asn	Phe	Asp	Gln	Gln	Thr	Ser	Gln	545	550	555
Asn	Ile	Lys	Asn	Gln	Leu	Ala	Glu	Leu	Asn	Ala	Thr	Asn	Ile	Tyr	Thr	565	570	575
Val	Leu	Asp	Lys	Ile	Lys	Leu	Asn	Ala	Lys	Met	Asn	Ile	Leu	Ile	Arg	580	585	590
Asp	Lys	Arg	Phe	His	Tyr	Asp	Arg	Asn	Asn	Ile	Ala	Val	Gly	Ala	Asp	595	600	605
Glu	Ser	Val	Val	Lys	Glu	Ala	His	Arg	Glu	Val	Ile	Asn	Ser	Ser	Thr	610	615	620
Glu	Gly	Leu	Leu	Leu	Asn	Ile	Asp	Lys	Asp	Ile	Arg	Lys	Ile	Leu	Ser	625	630	635

Gly	Tyr	Ile	Val	Glu	Ile	Glu	Asp	Thr	Glu	Gly	Leu	Lys	Glu	Val	Ile
				645					650					655	
Asn	Asp	Arg	Tyr	Asp	Met	Leu	Asn	Ile	Ser	Ser	Leu	Arg	Gln	Asp	Gly
			660					665					670		
Lys	Thr	Phe	Ile	Asp	Phe	Lys	Lys	Tyr	Asn	Asp	Lys	Leu	Pro	Leu	Tyr
		675					680					685			
Ile	Ser	Asn	Pro	Asn	Tyr	Lys	Val	Asn	Val	Tyr	Ala	Val	Thr	Lys	Glu
	690					695					700				
Asn	Thr	Ile	Ile	Asn	Pro	Ser	Glu	Asn	Gly	Asp	Thr	Ser	Thr	Asn	Gly
705					710					715					720
Ile	Lys	Lys	Ile	Leu	Ile	Phe	Ser	Lys	Lys	Gly	Tyr	Glu	Ile	Gly	Glx
			725						730					735	

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 <212> PRT  
 <213> Bacillus anthracis

<400> 16															
Glu	Val	Lys	Gln	Glu	Asn	Arg	Leu	Leu	Asn	Glu	Ser	Glu	Ser	Ser	Ser
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Gln	Gly	Leu	Leu	Gly	Tyr	Tyr	Phe	Ser	Asp	Leu	Asn	Phe	Gln	Ala	Pro
			20				25						30		
Met	Val	Val	Thr	Ser	Ser	Thr	Thr	Gly	Asp	Leu	Ser	Ile	Pro	Ser	Ser
		35					40					45			
Glu	Leu	Glu	Asn	Ile	Pro	Ser	Glu	Asn	Gln	Tyr	Phe	Gln	Ser	Ala	Ile
	50					55					60				
Trp	Ser	Gly	Phe	Ile	Lys	Val	Lys	Lys	Ser	Asp	Glu	Tyr	Thr	Phe	Ala
65					70					75					80
Thr	Ser	Ala	Asp	Asn	His	Val	Thr	Met	Trp	Val	Asp	Asp	Gln	Glu	Val
				85					90					95	
Ile	Asn	Lys	Ala	Ser	Asn	Ser	Asn	Lys	Ile	Arg	Leu	Glu	Lys	Gly	Arg
			100					105					110		
Leu	Tyr	Gln	Ile	Lys	Ile	Gln	Tyr	Gln	Arg	Glu	Asn	Pro	Thr	Glu	Lys
		115					120					125			
Gly	Leu	Asp	Phe	Lys	Leu	Tyr	Trp	Thr	Asp	Ser	Gln	Asn	Lys	Lys	Glu
	130					135					140				
Val	Ile	Ser	Ser	Asp	Asn	Leu	Gln	Leu	Pro	Glu	Leu	Lys	Gln	Lys	Ser
145					150					155					160
Ser	Asn	Ser	Arg	Lys	Lys	Arg	Ser	Thr	Ser	Ala	Gly	Pro	Thr	Val	Pro
				165					170					175	
Asp	Arg	Asp	Asn	Asp	Gly	Ile	Pro	Asp	Ser	Leu	Glu	Val	Glu	Gly	Tyr
			180					185					190		
Thr	Val	Asp	Val	Lys	Asn	Lys	Arg	Thr	Phe	Leu	Ser	Pro	Trp	Ile	Ser
		195					200					205			
Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu
	210					215					220				
Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr
225					230					235					240
Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val
				245					250					255	
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser
			260					265					270		
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Glu	Thr	Arg	Thr
		275					280					285			
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His
	290					295					300				

Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val
305					310					315					320
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His
			325						330					335	
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu
			340					345					350		
Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn
		355					360					365			
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val
370						375					380				
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln
385				390						395					400
Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu
			405						410					415	
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Asp	Phe	Ser	Ser	Thr	Pro	Ile
			420					425					430		
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu
		435					440					445			
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe
		450				455					460				
Glu	Asn	Gly	Arg	Val	Arg	Val	Asp	Thr	Gly	Ser	Asn	Trp	Ser	Glu	Val
465				470						475					480
Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys
			485						490					495	
Asp	Leu	Asn	Leu	Val	Glu	Arg	Arg	Ile	Ala	Ala	Val	Asn	Pro	Ser	Asp
			500					505					510		
Pro	Leu	Glu	Thr	Thr	Lys	Pro	Asp	Met	Thr	Leu	Lys	Glu	Ala	Leu	Lys
		515					520					525			
Ile	Ala	Phe	Gly	Phe	Asn	Glu	Pro	Asn	Gly	Asn	Leu	Gln	Tyr	Gln	Gly
		530				535					540				
Lys	Asp	Ile	Thr	Glu	Phe	Asp	Phe	Asn	Phe	Asp	Gln	Gln	Thr	Ser	Gln
545					550					555					560
Asn	Ile	Lys	Asn	Gln	Leu	Ala	Glu	Leu	Asn	Ala	Thr	Asn	Ile	Tyr	Thr
			565						570					575	
Val	Leu	Asp	Lys	Ile	Lys	Leu	Asn	Ala	Lys	Met	Asn	Ile	Leu	Ile	Arg
			580					585					590		
Asp	Lys	Arg	Phe	His	Tyr	Asp	Arg	Asn	Asn	Ile	Ala	Val	Gly	Ala	Asp
		595					600					605			
Glu	Ser	Val	Val	Lys	Glu	Ala	His	Arg	Glu	Val	Ile	Asn	Ser	Ser	Thr
		610				615					620				
Glu	Gly	Leu	Leu	Leu	Asn	Ile	Asp	Lys	Asp	Ile	Arg	Lys	Ile	Leu	Ser
625					630					635					640
Gly	Tyr	Ile	Val	Glu	Ile	Glu	Asp	Thr	Glu	Gly	Leu	Lys	Glu	Val	Ile
			645						650					655	
Asn	Asp	Arg	Tyr	Asp	Met	Leu	Asn	Ile	Ser	Ser	Leu	Arg	Gln	Asp	Gly
			660					665					670		
Lys	Thr	Phe	Ile	Asp	Phe	Lys	Lys	Tyr	Asn	Asp	Lys	Leu	Pro	Leu	Tyr
		675					680					685			
Ile	Ser	Asn	Pro	Asn	Tyr	Lys	Val	Asn	Val	Tyr	Ala	Val	Thr	Lys	Glu
		690				695					700				
Asn	Thr	Ile	Ile	Asn	Pro	Ser	Glu	Asn	Gly	Asp	Thr	Ser	Thr	Asn	Gly
705					710					715					720
Ile	Lys	Lys	Ile	Leu	Ile	Phe	Ser	Lys	Lys	Gly	Tyr	Glu	Ile	Gly	Glx
			725						730					735	

<210> 17

<211> 736

<212> PRT

<213> Bacillus anthracis

<400> 17

Glu	Val	Lys	Gln	Glu	Asn	Arg	Leu	Leu	Asn	Glu	Ser	Glu	Ser	Ser	Ser
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Gln	Gly	Leu	Leu	Gly	Tyr	Tyr	Phe	Ser	Asp	Leu	Asn	Phe	Gln	Ala	Pro
			20					25					30		
Met	Val	Val	Thr	Ser	Ser	Thr	Thr	Gly	Asp	Leu	Ser	Ile	Pro	Ser	Ser
		35					40					45			
Glu	Leu	Glu	Asn	Ile	Pro	Ser	Glu	Asn	Gln	Tyr	Phe	Gln	Ser	Ala	Ile
	50					55					60				
Trp	Ser	Gly	Phe	Ile	Lys	Val	Lys	Lys	Ser	Asp	Glu	Tyr	Thr	Phe	Ala
65					70					75					80
Thr	Ser	Ala	Asp	Asn	His	Val	Thr	Met	Trp	Val	Asp	Asp	Gln	Glu	Val
				85					90					95	
Ile	Asn	Lys	Ala	Ser	Asn	Ser	Asn	Lys	Ile	Arg	Leu	Glu	Lys	Gly	Arg
			100					105					110		
Leu	Tyr	Gln	Ile	Lys	Ile	Gln	Tyr	Gln	Arg	Glu	Asn	Pro	Thr	Glu	Lys
		115					120					125			
Gly	Leu	Asp	Phe	Lys	Leu	Tyr	Trp	Thr	Asp	Ser	Gln	Asn	Lys	Lys	Glu
	130					135					140				
Val	Ile	Ser	Ser	Asp	Asn	Leu	Gln	Leu	Pro	Glu	Leu	Lys	Gln	Lys	Ser
145					150					155					160
Ser	Asn	Ser	Arg	Lys	Lys	Arg	Ser	Thr	Ser	Ala	Gly	Pro	Thr	Val	Pro
				165					170					175	
Asp	Arg	Asp	Asn	Asp	Gly	Ile	Pro	Asp	Ser	Leu	Glu	Val	Glu	Gly	Tyr
			180					185					190		
Thr	Val	Asp	Val	Lys	Asn	Lys	Arg	Thr	Phe	Leu	Ser	Pro	Trp	Ile	Ser
		195					200					205			
Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu
	210					215					220				
Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr
225					230					235					240
Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val
				245					250					255	
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser
			260					265					270		
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Glu	Thr	Arg	Thr
		275					280					285			
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His
	290				295						300				
Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val
305					310					315					320
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His
				325					330					335	
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu
			340					345					350		
Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn
		355					360					365			
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val
	370					375					380				
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln
385					390					395					400
Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu
				405					410					415	
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Asp	Phe	Ser	Ser	Thr	Pro	Ile
			420					425						430	

Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
 435 440 445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly Glx  
 725 730 735

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<211> 736

<212> PRT

<213> Bacillus anthracis

<400> 18

Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
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 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
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 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95

Ile	Asn	Lys	Ala	Ser	Asn	Ser	Asn	Lys	Ile	Arg	Leu	Glu	Lys	Gly	Arg		
			100					105					110				
Leu	Tyr	Gln	Ile	Lys	Ile	Gln	Tyr	Gln	Arg	Glu	Asn	Pro	Thr	Glu	Lys		
		115					120					125					
Gly	Leu	Asp	Phe	Lys	Leu	Tyr	Trp	Thr	Asp	Ser	Gln	Asn	Lys	Lys	Glu		
	130					135					140						
Val	Ile	Ser	Ser	Asp	Asn	Leu	Gln	Leu	Pro	Glu	Leu	Lys	Gln	Lys	Ser		
145					150					155					160		
Ser	Asn	Ser	Arg	Lys	Lys	Arg	Ser	Thr	Ser	Ala	Gly	Pro	Thr	Val	Pro		
				165					170					175			
Asp	Arg	Asp	Asn	Asp	Gly	Ile	Pro	Asp	Ser	Leu	Glu	Val	Glu	Gly	Tyr		
			180					185					190				
Thr	Val	Asp	Val	Lys	Asn	Lys	Arg	Thr	Phe	Leu	Ser	Pro	Trp	Ile	Ser		
	195						200					205					
Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu		
	210					215					220						
Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr		
225					230					235					240		
Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val		
				245					250					255			
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser		
			260					265					270				
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Glu	Thr	Arg	Thr		
	275						280					285					
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His		
	290					295				300							
Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val		
305				310						315					320		
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His		
				325					330					335			
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu		
			340					345					350				
Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn		
	355						360					365					
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val		
	370					375					380						
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln		
385				390						395					400		
Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu		
				405					410					415			
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Asp	Phe	Ser	Ser	Thr	Pro	Ile		
			420					425					430				
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu		
	435					440						445					
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe		
	450					455					460						
Glu	Asn	Gly	Arg	Val	Arg	Val	Asp	Thr	Gly	Ser	Asn	Trp	Ser	Glu	Val		
465				470						475				480			
Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys		
				485					490					495			
Asp	Leu	Asn	Leu	Val	Glu	Arg	Arg	Ile	Ala	Ala	Val	Asn	Pro	Ser	Asp		
			500					505					510				
Pro	Leu	Glu	Thr	Thr	Lys	Pro	Asp	Met	Thr	Leu	Lys	Glu	Ala	Leu	Lys		
		515					520					525					
Ile	Ala	Phe	Gly	Phe	Asn	Glu	Pro	Asn	Gly	Asn	Leu	Gln	Tyr	Gln	Gly		
	530					535					540						
Lys	Asp	Ile	Thr	Glu	Phe	Asp	Phe	Asn	Phe	Asp	Gln	Gln	Thr	Ser	Gln		
545					550					555					560		

Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly Glx  
 725 730 735

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 <212> PRT  
 <213> Bacillus anthracis

<400> 19  
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 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220



Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
 290 295 300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
 305 310 315 320  
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
 340 345 350  
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile  
 420 425 430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
 435 440 445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480  
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
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 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685

Ile	Ser	Asn	Pro	Asn	Tyr	Lys	Val	Asn	Val	Tyr	Ala	Val	Thr	Lys	Glu
690						695					700				
Asn	Thr	Ile	Ile	Asn	Pro	Ser	Glu	Asn	Gly	Asp	Thr	Ser	Thr	Asn	Gly
705				710						715					720
Ile	Lys	Lys	Ile	Leu	Ile	Phe	Ser	Lys	Lys	Gly	Tyr	Glu	Ile	Gly	Glx
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<210> 20

<211> 736

<212> PRT

<213> Bacillus anthracis

<400> 20

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Gln	Gly	Leu	Leu	Gly	Tyr	Tyr	Phe	Ser	Asp	Leu	Asn	Phe	Gln	Ala	Pro
		20						25					30		
Met	Val	Val	Thr	Ser	Ser	Thr	Thr	Gly	Asp	Leu	Ser	Ile	Pro	Ser	Ser
	35					40						45			
Glu	Leu	Glu	Asn	Ile	Pro	Ser	Glu	Asn	Gln	Tyr	Phe	Gln	Ser	Ala	Ile
50						55					60				
Trp	Ser	Gly	Phe	Ile	Lys	Val	Lys	Lys	Ser	Asp	Glu	Tyr	Thr	Phe	Ala
65				70						75					80
Thr	Ser	Ala	Asp	Asn	His	Val	Thr	Met	Trp	Val	Asp	Asp	Gln	Glu	Val
			85					90					95		
Ile	Asn	Lys	Ala	Ser	Asn	Ser	Asn	Lys	Ile	Arg	Leu	Glu	Lys	Gly	Arg
			100					105					110		
Leu	Tyr	Gln	Ile	Lys	Ile	Gln	Tyr	Gln	Arg	Glu	Asn	Pro	Thr	Glu	Lys
		115				120						125			
Gly	Leu	Asp	Phe	Lys	Leu	Tyr	Trp	Thr	Asp	Ser	Gln	Asn	Lys	Lys	Glu
130						135					140				
Val	Ile	Ser	Ser	Asp	Asn	Leu	Gln	Leu	Pro	Glu	Leu	Lys	Gln	Lys	Ser
145				150						155					160
Ser	Asn	Ser	Arg	Lys	Lys	Arg	Ser	Thr	Ser	Ala	Gly	Pro	Thr	Val	Pro
			165					170						175	
Asp	Arg	Asp	Asn	Asp	Gly	Ile	Pro	Asp	Ser	Leu	Glu	Val	Glu	Gly	Tyr
			180					185					190		
Thr	Val	Asp	Val	Lys	Asn	Lys	Arg	Thr	Phe	Leu	Ser	Pro	Trp	Ile	Ser
	195					200						205			
Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu
210						215					220				
Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr
225				230						235					240
Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val
			245						250					255	
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser
			260					265					270		
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Glu	Thr	Arg	Thr
		275				280						285			
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His
290						295						300			
Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val
305					310					315					320
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His
			325						330					335	
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu
			340					345					350		

Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn
		355					360					365			
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val
		370				375					380				
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln
385						390				395					400
Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu
			405						410					415	
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Asp	Phe	Ser	Ser	Thr	Pro	Ile
			420					425						430	
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu
		435					440					445			
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe
		450				455					460				
Glu	Asn	Gly	Arg	Val	Arg	Val	Asp	Thr	Gly	Ser	Asn	Trp	Ser	Glu	Val
465						470				475					480
Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys
			485						490					495	
Asp	Leu	Asn	Leu	Val	Glu	Arg	Arg	Ile	Ala	Ala	Val	Asn	Pro	Ser	Asp
			500					505					510		
Pro	Leu	Glu	Thr	Thr	Lys	Pro	Asp	Met	Thr	Leu	Lys	Glu	Ala	Leu	Lys
		515					520					525			
Ile	Ala	Phe	Gly	Phe	Asn	Glu	Pro	Asn	Gly	Asn	Leu	Gln	Tyr	Gln	Gly
		530				535					540				
Lys	Asp	Ile	Thr	Glu	Phe	Asp	Phe	Asn	Phe	Asp	Gln	Gln	Thr	Ser	Gln
545					550					555					560
Asn	Ile	Lys	Asn	Gln	Leu	Ala	Glu	Leu	Asn	Ala	Thr	Asn	Ile	Tyr	Thr
			565						570					575	
Val	Leu	Asp	Lys	Ile	Lys	Leu	Asn	Ala	Lys	Met	Asn	Ile	Leu	Ile	Arg
		580						585					590		
Asp	Lys	Arg	Phe	His	Tyr	Asp	Arg	Asn	Asn	Ile	Ala	Val	Gly	Ala	Asp
		595					600					605			
Glu	Ser	Val	Val	Lys	Glu	Ala	His	Arg	Glu	Val	Ile	Asn	Ser	Ser	Thr
		610				615					620				
Glu	Gly	Leu	Leu	Leu	Asn	Ile	Asp	Lys	Asp	Ile	Arg	Lys	Ile	Leu	Ser
625					630					635					640
Gly	Tyr	Ile	Val	Glu	Ile	Glu	Asp	Thr	Glu	Gly	Leu	Lys	Glu	Val	Ile
			645						650					655	
Asn	Asp	Arg	Tyr	Asp	Met	Leu	Asn	Ile	Ser	Ser	Leu	Arg	Gln	Asp	Gly
		660						665					670		
Lys	Thr	Phe	Ile	Asp	Phe	Lys	Lys	Tyr	Asn	Asp	Lys	Leu	Pro	Leu	Tyr
		675					680					685			
Ile	Ser	Asn	Pro	Asn	Tyr	Lys	Val	Asn	Val	Tyr	Ala	Val	Thr	Lys	Glu
		690				695					700				
Asn	Thr	Ile	Ile	Asn	Pro	Ser	Glu	Asn	Gly	Asp	Thr	Ser	Thr	Asn	Gly
705					710					715					720
Ile	Lys	Lys	Ile	Leu	Ile	Phe	Ser	Lys	Lys	Gly	Tyr	Glu	Ile	Gly	Glx
			725						730					735	

<210> 21

<211> 736

<212> PRT

<213> Bacillus anthracis

<400> 21

Glu	Val	Lys	Gln	Glu	Asn	Arg	Leu	Leu	Asn	Glu	Ser	Glu	Ser	Ser	Ser
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 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser  
 35 40 45  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95  
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg  
 100 105 110  
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys  
 115 120 125  
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu  
 130 135 140  
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser  
 145 150 155 160  
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro  
 165 170 175  
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr  
 180 185 190  
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser  
 195 200 205  
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu  
 210 215 220  
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr  
 225 230 235 240  
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val  
 245 250 255  
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser  
 260 265 270  
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr  
 275 280 285  
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His  
 290 295 300  
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val  
 305 310 315 320  
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His  
 325 330 335  
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu  
 340 345 350  
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn  
 355 360 365  
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val  
 370 375 380  
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln  
 385 390 395 400  
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu  
 405 410 415  
 Ala-Pro-Ile-Ala-Leu-Asn-Ala-Gln-Asp-Asp-Phe-Ser-Ser-Thr-Pro-Ile  
 420 425 430  
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu  
 435 440 445  
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe  
 450 455 460  
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val  
 465 470 475 480

Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys  
 485 490 495  
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp  
 500 505 510  
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys  
 515 520 525  
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly  
 530 535 540  
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln  
 545 550 555 560  
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr  
 565 570 575  
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg  
 580 585 590  
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp  
 595 600 605  
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr  
 610 615 620  
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser  
 625 630 635 640  
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile  
 645 650 655  
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly  
 660 665 670  
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr  
 675 680 685  
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu  
 690 695 700  
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly  
 705 710 715 720  
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly Glx  
 725 730 735

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 <212> DNA  
 <213> Bacillus anthracis

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 ggggatttat ctattcctag ttctgagtta gaaaatattc catcggaaaa ccaatatttt 180  
 caatctgcta tttggtcagg atttatcaaa gttaagaaga gtgatgaata tacatttgct 240  
 acttccgctg ataatcatgt aacaatgtgg gtagatgacc aagaagtgat taataaagct 300  
 tctaattcta acaaaatcag attagaaaaa ggaagattat atcaataaaa aattcaatat 360  
 caacgagaaa atcctactga aaaaggattg gatttcaagt tgtactggac cgatttctca 420  
 aataaaaaag aagtgatttc tagtgataac ttacaattgc cagaattaaa acaaaaatct 480  
 tcgaactcaa gaaaaagcg aagtacaagt gctggaccta cggttccaga ccgtgacaat 540  
 gatggaatcc ctgattcatt agaggtagaa ggatatacgg ttgatgtcaa aaataaaga 600  
 acttttcttt caccatggat ttctaataat catgaaaaga aaggattaac caaatataaa 660  
 tcatctcctg aaaaatggag cacggcttct gatccgtaca gtgatttcga aaaggttaca 720  
 ggacggattg ataagaatgt atcaccagag gcaagacacc cccttggtgc agcttatccg 780  
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 gcaggggaaa gaacttgggc tgaaacaatg ggtttaaata ccgctgatac agcaagatta 1080

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ttaagtcaaa tacttgacc taataattat tatccttcta aaaacttggc gccaatcgca 1260
ttaaattgcac aagacgattt cagttctact ccaattacaa tgaattacaa tcaatttctt 1320
gagttagaaa aaacgaaaca attaagatta gatacggatc aagtatatgg gaatatagca 1380
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atgacattaa aagaagccct taaaatagca tttggattta acgaaccgaa tggaaactta 1620
caatatcaag ggaaagacat aaccgaattt gattttaatt tcgatcaaca aacatctcaa 1680
aatatcaaga atcagttagc ggaattaaac gcaactaaca tatatactgt attagataaa 1740
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gatatgttga atatttctag ttacggcaa gatggaaaaa catttataga ttttaaaaaa 2040
tataatgata aattaccgtt atataatagt aatcccaatt ataaggtaaa tgatatgct 2100
gttactaaag aaaacactat tattaatcct agtgagaatg gggatactag taccaacggg 2160
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<210> 23

<211> 736

<212> PRT

<213> Bacillus anthracis

<400> 23

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20          25          30
Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
35          40          45
Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile
50          55          60
Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
65          70          75          80
Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
85          90          95
Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
100         105         110
Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
115         120         125
Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
130         135         140
Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
145         150         155         160
Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
165         170         175
Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
180         185         190
Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser
195         200         205
Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
210         215         220
Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
225         230         235         240
Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
245         250         255

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Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser	260	265	270
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Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His	290	295	300
Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val	305	310	315
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His	325	330	335
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu	340	345	350
Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn	355	360	365
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val	370	375	380
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln	385	390	395
Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu	405	410	415
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Asp	Phe	Ser	Ser	Thr	Pro	Ile	420	425	430
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu	435	440	445
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe	450	455	460
Glu	Asn	Gly	Arg	Val	Arg	Val	Asp	Thr	Gly	Ser	Asn	Trp	Ser	Glu	Val	465	470	475
Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys	485	490	495
Asp	Leu	Asn	Leu	Val	Glu	Arg	Arg	Ile	Ala	Ala	Val	Asn	Pro	Ser	Asp	500	505	510
Pro	Leu	Glu	Thr	Thr	Lys	Pro	Asp	Met	Thr	Leu	Lys	Glu	Ala	Leu	Lys	515	520	525
Ile	Ala	Phe	Gly	Phe	Asn	Glu	Pro	Asn	Gly	Asn	Leu	Gln	Tyr	Gln	Gly	530	535	540
Lys	Asp	Ile	Thr	Glu	Phe	Asp	Phe	Asn	Phe	Asp	Gln	Gln	Thr	Ser	Gln	545	550	555
Asn	Ile	Lys	Asn	Gln	Leu	Ala	Glu	Leu	Asn	Ala	Thr	Asn	Ile	Tyr	Thr	565	570	575
Val	Leu	Asp	Lys	Ile	Lys	Leu	Asn	Ala	Lys	Met	Asn	Ile	Leu	Ile	Arg	580	585	590
Asp	Lys	Arg	Phe	His	Tyr	Asp	Arg	Asn	Asn	Ile	Ala	Val	Gly	Ala	Asp	595	600	605
Glu	Ser	Val	Val	Lys	Glu	Ala	His	Arg	Glu	Val	Ile	Asn	Ser	Ser	Thr	610	615	620
Glu	Gly	Leu	Leu	Leu	Asn	Ile	Asp	Lys	Asp	Ile	Arg	Lys	Ile	Leu	Ser	625	630	635
Gly	Tyr	Ile	Val	Glu	Ile	Glu	Asp	Thr	Glu	Gly	Leu	Lys	Glu	Val	Ile	645	650	655
Asn	Asp	Arg	Tyr	Asp	Met	Leu	Asn	Ile	Ser	Ser	Leu	Arg	Gln	Asp	Gly	660	665	670
Lys	Thr	Phe	Ile	Asp	Phe	Lys	Lys	Tyr	Asn	Asp	Lys	Leu	Pro	Leu	Tyr	675	680	685
Ile	Ser	Asn	Pro	Asn	Tyr	Lys	Val	Asn	Val	Tyr	Ala	Val	Thr	Lys	Glu	690	695	700
Asn	Thr	Ile	Ile	Asn	Pro	Ser	Glu	Asn	Gly	Asp	Thr	Ser	Thr	Asn	Gly	705	710	715

Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly Glx  
725 730 735

<210> 24  
<211> 599  
<212> PRT  
<213> Bacillus anthracis

<400> 24  
Thr Asp Ser Gln Asn Lys Lys Glu Val Ile Ser Ser Asp Asn Leu Gln  
1 5 10 15  
Leu Pro Glu Leu Lys Gln Lys Ser Ser Asn Ser Arg Lys Lys Arg Ser  
20 25 30  
Thr Ser Ala Gly Pro Thr Val Pro Asp Arg Asp Asn Asp Gly Ile Pro  
35 40 45  
Asp Ser Leu Glu Val Glu Gly Tyr Thr Val Asp Val Lys Asn Lys Arg  
50 55 60  
Thr Phe Leu Ser Pro Trp Ile Ser Asn Ile His Glu Lys Lys Gly Leu  
65 70 75 80  
Thr Lys Tyr Lys Ser Ser Pro Glu Lys Trp Ser Thr Ala Ser Asp Pro  
85 90 95  
Tyr Ser Asp Phe Glu Lys Val Thr Gly Arg Ile Asp Lys Asn Val Ser  
100 105 110  
Pro Glu Ala Arg His Pro Leu Val Ala Ala Tyr Pro Ile Val His Val  
115 120 125  
Asp Met Glu Asn Ile Ile Leu Ser Lys Asn Glu Asp Gln Ser Thr Gln  
130 135 140  
Asn Thr Asp Ser Gln Thr Arg Thr Ile Ser Lys Asn Thr Ser Thr Ser  
145 150 155 160  
Arg Thr His Thr Ser Glu Val His Gly Asn Ala Glu Val His Ala Ser  
165 170 175  
Phe Phe Asp Ile Gly Gly Ser Val Ser Ala Gly Phe Ser Asn Ser Asn  
180 185 190  
Ser Ser Thr Val Ala Ile Asp His Ser Leu Ser Leu Ala Gly Glu Arg  
195 200 205  
Thr Trp Ala Glu Thr Met Gly Leu Asn Thr Ala Asp Thr Ala Arg Leu  
210 215 220  
Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr Ala Pro Ile Tyr Asn  
225 230 235 240  
Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys Asn Gln Thr Leu Ala  
245 250 255  
Thr Ile Lys Ala Lys Glu Asn Gln Leu Ser Gln Ile Leu Ala Pro Asn  
260 265 270  
Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile Ala Leu Asn Ala Gln  
275 280 285  
Asp Asp Phe Ser Ser Thr Pro Ile Thr Met Asn Tyr Asn Gln Phe Leu  
290 295 300  
Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp Thr Asp Gln Val Tyr  
305 310 315 320  
Gly Asn Ile Ala Thr Tyr Asn Phe Glu Asn Gly Arg Val Arg Val Asp  
325 330 335  
Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln Ile Gln Glu Thr Thr  
340 345 350  
Ala Arg Ile Ile Phe Asn Gly Lys Asp Leu Asn Leu Val Glu Arg Arg  
355 360 365  
Ile Ala Ala Val Asn Pro Ser Asp Pro Leu Glu Thr Thr Lys Pro Asp  
370 375 380



Met Thr Leu Lys Glu Ala Leu Lys Ile Ala Phe Gly Phe Asn Glu Pro  
 385 390 395 400  
 Asn Gly Asn Leu Gln Tyr Gln Gly Lys Asp Ile Thr Glu Phe Asp Phe  
 405 410 415  
 Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys Asn Gln Leu Ala Glu  
 420 425 430  
 Leu Asn Val Thr Asn Ile Tyr Thr Val Leu Asp Lys Ile Lys Leu Asn  
 435 440 445  
 Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg Phe His Tyr Asp Arg  
 450 455 460  
 Asn Asn Ile Ala Val Gly Ala Asp Glu Ser Val Val Lys Glu Ala His  
 465 470 475 480  
 Arg Glu Val Ile Asn Ser Ser Thr Glu Gly Leu Leu Leu Asn Ile Asp  
 485 490 495  
 Lys Asp Ile Arg Lys Ile Leu Ser Gly Tyr Ile Val Glu Ile Glu Asp  
 500 505 510  
 Thr Glu Gly Leu Lys Glu Val Ile Asn Asp Arg Tyr Asp Met Leu Asn  
 515 520 525  
 Ile Ser Ser Leu Arg Gln Asp Gly Lys Thr Phe Ile Asp Phe Lys Lys  
 530 535 540  
 Tyr Asn Asp Lys Leu Pro Leu Tyr Ile Ser Asn Pro Asn Tyr Lys Val  
 545 550 555 560  
 Asn Val Tyr Ala Val Thr Lys Glu Asn Thr Ile Ile Asn Pro Ser Glu  
 565 570 575  
 Asn Gly Asp Thr Ser Thr Asn Gly Ile Lys Lys Ile Leu Ile Phe Ser  
 580 585 590  
 Lys Lys Gly Tyr Glu Ile Gly  
 595

<210> 25  
 <211> 705  
 <212> PRT  
 <213> Clostridium difficile

<400> 25  
 Glu Leu Asp Gly Met Lys Lys Ile Ile Pro Glu Glu Asn Leu Phe Leu  
 1 5 10 15  
 Arg Asp Tyr Ser Asn Ile Glu Lys Asp Asp Pro Phe Ile Pro Asn Asn  
 20 25 30  
 Asn Phe Phe Asp Pro Lys Leu Met Ser Asp Trp Glu Asp Glu Asp Leu  
 35 40 45  
 Asp Thr Asp Asn Asp Asn Ile Pro Asp Ser Tyr Glu Arg Asn Gly Tyr  
 50 55 60  
 Thr Ile Lys Asp Leu Ile Ala Val Lys Trp Glu Asp Ser Phe Ala Glu  
 65 70 75 80  
 Gln Gly Tyr Lys Lys Tyr Val Ser Asn Tyr Leu Glu Ser Asn Thr Ala  
 85 90 95  
 Gly Asp Pro Tyr Thr Asp Tyr Glu Lys Ala Ser Gly Ser Phe Asp Lys  
 100 105 110  
 Ala Ile Lys Thr Glu Ala Arg Asp Pro Leu Val Ala Ala Tyr Pro Ile  
 115 120 125  
 Val Gly Val Gly Met Glu Lys Leu Ile Ile Ser Thr Asn Glu His Ala  
 130 135 140  
 Ser Thr Asp Gln Gly Lys Thr Val Ser Arg Ala Thr Thr Asn Ser Lys  
 145 150 155 160  
 Thr Glu Ser Asn Thr Ala Gly Val Ser Val Asn Val Gly Tyr Gln Asn  
 165 170 175



Tyr Ser Gly Phe Lys Asp Ile Gly Thr Lys Asp Lys Glu Met Arg Asn  
 645 650 655  
 Tyr Leu Gly Asp Pro Asn Gln Pro Lys Thr Asn Tyr Val Asn Leu Arg  
 660 665 670  
 Ser Tyr Phe Thr Gly Gly Glu Asn Ile Met Thr Tyr Lys Lys Leu Arg  
 675 680 685  
 Ile Tyr Ala Ile Thr Pro Asp Asp Arg Glu Leu Leu Val Leu Ser Val  
 690 695 700  
 Asp  
 705

<210> 26  
 <211> 706  
 <212> PRT  
 <213> Clostridium perfringens

<400> 26  
 Glu Leu Asn Gly Asn Lys Thr Val Ile Pro Glu Glu Asn Leu Phe Phe  
 1 5 10 15  
 Arg Asp Tyr Ser Lys Ile Asp Glu Asn Asp Pro Phe Ile Pro Asn Asn  
 20 25 30  
 Asn Phe Phe Asp Val Arg Phe Phe Ser Ala Ala Trp Glu Asp Glu Asp  
 35 40 45  
 Leu Asp Thr Asp Asn Asp Asn Ile Pro Asp Ala Tyr Glu Lys Asn Gly  
 50 55 60  
 Tyr Thr Ile Lys Asp Ser Ile Ala Val Lys Trp Asn Asp Ser Phe Ala  
 65 70 75 80  
 Glu Gln Gly Tyr Lys Lys Tyr Val Ser Ser Tyr Leu Glu Ser Asn Thr  
 85 90 95  
 Ala Gly Asp Pro Tyr Thr Asp Tyr Gln Lys Ala Ser Gly Ser Ile Asp  
 100 105 110  
 Lys Ala Ile Lys Leu Glu Ala Arg Asp Pro Leu Val Ala Ala Tyr Pro  
 115 120 125  
 Val Val Gly Val Gly Met Glu Asn Leu Ile Ile Ser Thr Asn Glu His  
 130 135 140  
 Ala Ser Ser Asp Gln Gly Lys Thr Val Ser Arg Ala Thr Thr Asn Ser  
 145 150 155 160  
 Lys Thr Asp Ala Asn Thr Val Gly Val Ser Ile Ser Ala Gly Tyr Gln  
 165 170 175  
 Asn Gly Phe Thr Gly Asn Ile Thr Thr Ser Tyr Ser His Thr Thr Asp  
 180 185 190  
 Asn Ser Thr Ala Val Gln Asp Ser Asn Gly Glu Ser Trp Asn Thr Gly  
 195 200 205  
 Leu Ser Ile Asn Lys Gly Glu Ser Ala Tyr Ile Asn Ala Asn Val Arg  
 210 215 220  
 Tyr Tyr Asn Thr Gly Thr Ala Pro Met Tyr Lys Val Thr Pro Thr Thr  
 225 230 235 240  
 Asn Leu Val Leu Asp Gly Glu Thr Leu Ala Thr Ile Lys Ala Gln Asp  
 245 250 255  
 Asn Gln Ile Gly Asn Asn Leu Ser Pro Asn Glu Thr Tyr Pro Lys Lys  
 260 265 270  
 Gly Leu Ser Pro Leu Ala Leu Asn Thr Met Asp Gln Phe Asn Ala Arg  
 275 280 285  
 Leu Ile Pro Ile Asn Tyr Asp Gln Leu Lys Lys Leu Asp Ser Gly Lys  
 290 295 300  
 Gln Ile Lys Leu Glu Thr Thr Gln Val Ser Gly Asn Tyr Gly Thr Lys  
 305 310 315 320

Asn	Ser	Gln	Gly	Gln	Ile	Ile	Thr	Glu	Gly	Asn	Ser	Trp	Ser	Asn	Tyr
				325					330					335	
Ile	Ser	Gln	Ile	Asp	Ser	Val	Ser	Ala	Ser	Ile	Ile	Leu	Asp	Thr	Gly
			340					345					350		
Ser	Gln	Thr	Phe	Glu	Arg	Arg	Val	Ala	Ala	Lys	Glu	Gln	Gly	Asn	Pro
		355					360					365			
Glu	Asp	Lys	Thr	Pro	Glu	Ile	Thr	Ile	Gly	Glu	Ala	Ile	Lys	Lys	Ala
	370					375					380				
Phe	Ser	Ala	Thr	Lys	Asn	Gly	Glu	Leu	Leu	Tyr	Phe	Asn	Gly	Ile	Pro
385					390					395					400
Ile	Asp	Glu	Ser	Cys	Val	Glu	Leu	Ile	Phe	Asp	Asp	Asn	Thr	Ser	Glu
				405					410						415
Ile	Ile	Lys	Glu	Gln	Leu	Lys	Tyr	Leu	Asp	Asp	Lys	Lys	Ile	Tyr	Asn
			420					425					430		
Val	Lys	Leu	Glu	Arg	Gly	Met	Asn	Ile	Leu	Ile	Lys	Val	Pro	Ser	Tyr
		435					440					445			
Phe	Thr	Asn	Phe	Asp	Glu	Tyr	Asn	Asn	Phe	Pro	Ala	Ser	Trp	Ser	Asn
	450					455					460				
Ile	Asp	Thr	Lys	Asn	Gln	Asp	Gly	Leu	Gln	Ser	Val	Ala	Asn	Lys	Leu
465					470					475					480
Ser	Gly	Glu	Thr	Lys	Ile	Ile	Ile	Pro	Met	Ser	Lys	Leu	Lys	Pro	Tyr
				485					490					495	
Lys	Arg	Tyr	Val	Phe	Ser	Gly	Tyr	Ser	Lys	Asp	Pro	Ser	Thr	Ser	Asn
			500					505					510		
Ser	Ile	Thr	Val	Asn	Ile	Lys	Ser	Lys	Glu	Gln	Lys	Thr	Asp	Tyr	Leu
		515					520					525			
Val	Pro	Glu	Lys	Asp	Tyr	Thr	Lys	Phe	Ser	Tyr	Glu	Phe	Glu	Thr	Thr
	530					535					540				
Gly	Lys	Asp	Ser	Ser	Asp	Ile	Glu	Ile	Thr	Leu	Thr	Ser	Ser	Gly	Val
545					550					555					560
Ile	Phe	Leu	Asp	Asn	Leu	Ser	Ile	Thr	Glu	Leu	Asn	Ser	Thr	Pro	Glu
				565					570					575	
Ile	Leu	Lys	Glu	Pro	Glu	Ile	Lys	Val	Pro	Ser	Asp	Gln	Glu	Ile	Leu
			580					585					590		
Asp	Ala	His	Asn	Lys	Tyr	Tyr	Ala	Asp	Ile	Lys	Leu	Asp	Thr	Asn	Thr
		595					600					605			
Gly	Asn	Thr	Tyr	Ile	Asp	Gly	Ile	Tyr	Phe	Glu	Pro	Thr	Gln	Thr	Asn
	610					615					620				
Lys	Glu	Ala	Leu	Asp	Tyr	Ile	Gln	Lys	Tyr	Arg	Val	Glu	Ala	Thr	Leu
625					630					635					640
Gln	Tyr	Ser	Gly	Phe	Lys	Asp	Ile	Gly	Thr	Lys	Asp	Lys	Glu	Ile	Arg
				645					650					655	
Asn	Tyr	Leu	Gly	Asp	Gln	Asn	Gln	Pro	Lys	Thr	Asn	Tyr	Ile	Asn	Phe
			660					665					670		
Arg	Ser	Tyr	Phe	Thr	Ser	Gly	Glu	Asn	Val	Met	Thr	Tyr	Lys	Lys	Leu
		675					680					685			
Arg	Ile	Tyr	Ala	Val	Thr	Pro	Asp	Asn	Arg	Glu	Leu	Leu	Val	Leu	Ser
	690					695					700				
Val	Asn														
705															

<210> 27  
 <211> 712  
 <212> PRT  
 <213> Clostridium spiroforme

<400> 27

Glu	Leu	Asn	Gly	Asp	Lys	Thr	Leu	Ile	Pro	Glu	Lys	Asn	Leu	Phe	Leu
1				5					10					15	
Arg	Asp	Tyr	Ser	Lys	Ile	Asp	Glu	Asn	Asp	Pro	Phe	Ile	Pro	Lys	Asp
		20						25					30		
Asn	Phe	Phe	Asp	Leu	Lys	Leu	Lys	Ser	Arg	Ser	Ala	Arg	Leu	Ala	Ser
		35					40					45			
Gly	Trp	Gly	Asp	Glu	Asp	Leu	Asp	Thr	Asp	Asn	Asp	Asn	Ile	Pro	Asp
	50					55					60				
Ala	Tyr	Glu	Lys	Asn	Gly	Tyr	Thr	Ile	Lys	Asp	Ser	Ile	Ala	Val	Lys
65					70					75					80
Trp	Glu	Asp	Ser	Phe	Ala	Gln	Gln	Gly	Tyr	Lys	Lys	Tyr	Leu	Ser	Ser
				85					90					95	
Tyr	Leu	Glu	Ser	Asn	Thr	Ala	Gly	Asp	Pro	Tyr	Thr	Asp	Tyr	Gln	Lys
			100					105					110		
Ala	Ser	Gly	Ser	Phe	Asp	Lys	Ala	Ile	Lys	Ala	Glu	Ala	Arg	Asp	Pro
		115					120					125			
Leu	Val	Ala	Ala	Tyr	Pro	Val	Val	Gly	Val	Gly	Met	Glu	Lys	Leu	Ile
	130					135					140				
Ile	Ser	Thr	Asn	Glu	His	Ala	Ser	Thr	Asp	Gln	Gly	Lys	Thr	Val	Ser
145					150					155					160
Arg	Asn	Thr	Thr	Asn	Ser	Lys	Thr	Asp	Ala	Asn	Thr	Ala	Gly	Val	Ala
				165					170					175	
Ile	Asn	Ile	Ala	Tyr	Gln	Asn	Gly	Phe	Thr	Gly	Ser	Ile	Thr	Thr	Asn
			180					185					190		
Tyr	Ser	His	Thr	Thr	Glu	Asn	Ser	Thr	Ala	Val	Gln	Asn	Ser	Asn	Gly
		195				200						205			
Glu	Ser	Trp	Asn	Thr	Ser	Leu	Ser	Ile	Asn	Lys	Gly	Glu	Ser	Ala	Tyr
	210					215					220				
Ile	Asn	Ala	Asn	Val	Arg	Tyr	Tyr	Asn	Thr	Gly	Thr	Ala	Pro	Met	Tyr
225					230					235					240
Lys	Val	Thr	Pro	Thr	Thr	Asn	Leu	Val	Leu	Asp	Gly	Asp	Thr	Leu	Thr
				245					250					255	
Thr	Ile	Lys	Ala	Gln	Asp	Asn	Gln	Ile	Gly	Asn	Asn	Leu	Ser	Pro	Asn
			260					265					270		
Glu	Thr	Tyr	Pro	Lys	Lys	Gly	Leu	Ser	Pro	Leu	Ala	Leu	Asn	Thr	Met
		275					280					285			
Asp	Gln	Phe	Ser	Ser	Arg	Leu	Ile	Pro	Ile	Asn	Tyr	Asp	Gln	Leu	Lys
	290					295					300				
Lys	Leu	Asp	Ala	Gly	Lys	Gln	Ile	Lys	Leu	Glu	Thr	Thr	Gln	Val	Ser
305					310					315					320
Gly	Asn	Tyr	Gly	Ile	Lys	Asn	Ser	Gln	Gly	Gln	Ile	Ile	Thr	Glu	Gly
				325					330					335	
Asn	Ser	Trp	Ser	Asp	Tyr	Ile	Ser	Gln	Ile	Asp	Ser	Leu	Ser	Ala	Ser
			340					345					350		
Ile	Ile	Leu	Asp	Thr	Gly	Ser	Asp	Val	Phe	Glu	Arg	Arg	Val	Thr	Ala
		355					360				365				
Lys	Asp	Ser	Ser	Asn	Pro	Glu	Asp	Lys	Thr	Pro	Val	Leu	Thr	Ile	Gly
	370					375					380				
Glu	Ala	Ile	Glu	Lys	Ala	Phe	Gly	Ala	Thr	Lys	Asn	Gly	Glu	Ile	Leu
385					390					395					400
Tyr	Phe	Asn	Gly	Met	Pro	Ile	Asp	Glu	Ser	Cys	Val	Glu	Leu	Ile	Phe
				405					410					415	
Asp	Gly	Asn	Thr	Ala	Asn	Leu	Ile	Lys	Glu	Arg	Leu	Asn	Ala	Leu	Asn
			420					425					430		
Asp	Lys	Lys	Ile	Tyr	Asn	Val	Gln	Leu	Glu	Arg	Gly	Met	Lys	Ile	Leu
		435					440					445			
Ile	Lys	Thr	Ser	Thr	Tyr	Phe	Asn	Asn	Phe	Asp	Gly	Tyr	Asn	Asn	Phe
	450					455					460				

Pro Ser Ser Trp Ser Asn Val Asp Ser Asn Asn Gln Asp Gly Leu Gln  
 465 470 475 480  
 Asn Ala Ala Asn Lys Leu Ser Gly Glu Thr Lys Ile Val Ile Pro Met  
 485 490 495  
 Ser Lys Leu Asn Pro Tyr Lys Arg Tyr Val Phe Ser Gly Tyr Leu Lys  
 500 505 510  
 Asn Ser Ser Thr Ser Asn Pro Ile Thr Val Asn Ile Lys Ala Lys Glu  
 515 520 525  
 Gln Lys Thr Tyr Asn Leu Val Ser Glu Asn Asp Tyr Lys Lys Phe Ser  
 530 535 540  
 Tyr Glu Phe Glu Thr Ile Gly Arg Asp Ala Ser Asn Ile Glu Ile Thr  
 545 550 555 560  
 Leu Thr Ser Ser Gly Thr Ile Phe Leu Asp Asn Leu Ser Ile Thr Glu  
 565 570 575  
 Leu Asn Ser Thr Pro Glu Ile Leu Lys Glu Pro Asp Ile Lys Val Pro  
 580 585 590  
 Ser Asp Gln Glu Ile Ile Asp Ala His Lys Lys Tyr Tyr Ala Asp Leu  
 595 600 605  
 Ser Phe Asn Gln Ser Thr Ala Asn Tyr Tyr Leu Asp Gly Leu Tyr Phe  
 610 615 620  
 Glu Pro Thr Gln Thr Asn Lys Glu Val Leu Asp Tyr Ile Gln Lys Tyr  
 625 630 635 640  
 Lys Val Glu Ala Thr Leu Glu Tyr Ser Gly Phe Lys Asp Ile Gly Thr  
 645 650 655  
 Lys Asp Lys Glu Leu Arg Asn Tyr Thr Gly Asp Ser Asn Gln Pro Lys  
 660 665 670  
 Thr Asn Tyr Val Asn Phe Arg Ser Tyr Phe Thr Ser Gly Glu Asn Val  
 675 680 685  
 Met Pro Tyr Lys Lys Leu Arg Ile Tyr Ala Ile Thr Pro Glu Asn Lys  
 690 695 700  
 Glu Leu Leu Val Leu Ser Ile Asn  
 705 710

<210> 28

<211> 582

<212> PRT

<213> Clostridium botulinum

<400> 28

Glu Thr Ser Asp Ile Ile Lys Glu Ile Ile Pro Ser Glu Val Leu Leu  
 1 5 10 15  
 Lys Pro Asn Tyr Ser Asn Thr Asn Glu Lys Ser Lys Phe Ile Pro Asn  
 20 25 30  
 Asn Thr Leu Phe Ser Asn Ala Lys Leu Lys Ala Asn Ala Asn Arg Asp  
 35 40 45  
 Thr Asp Arg Asp Gly Ile Pro Asp Glu Trp Glu Ile Asn Gly Tyr Thr  
 50 55 60  
 Val Met Asn Gln Lys Ala Val Ala Trp Asp Asp Lys Phe Ala Ala Asn  
 65 70 75 80  
~~Gly Tyr Lys Lys Tyr Val Ser Asn Pro Phe Lys Pro Cys Thr Ala Asn~~  
~~85 90 95~~  
 Asp Pro Tyr Thr Asp Phe Glu Lys Val Ser Gly Gln Ile Asp Pro Ser  
 100 105 110  
 Val Ser Met Val Ala Arg Asp Pro Met Ile Ser Ala Tyr Pro Ile Val  
 115 120 125  
 Gly Val Gln Met Glu Arg Leu Val Val Ser Lys Ser Glu Thr Ile Thr  
 130 135 140

Gly Asp Ser Thr Lys Ser Met Ser Lys Ser Thr Ser His Ser Ser Thr  
 145 150 155 160  
 Asn Ile Asn Thr Val Gly Ala Glu Val Ser Gly Ser Leu Gln Leu Ala  
 165 170 175  
 Gly Gly Ile Phe Pro Val Phe Ser Met Ser Ala Ser Ala Asn Tyr Ser  
 180 185 190  
 His Thr Trp Gln Asn Thr Ser Thr Val Asp Asp Thr Thr Gly Glu Ser  
 195 200 205  
 Phe Ser Gln Gly Leu Ser Ile Asn Thr Gly Glu Ser Ala Tyr Ile Asn  
 210 215 220  
 Pro Asn Ile Arg Tyr Tyr Asn Thr Gly Thr Ala Pro Val Tyr Asn Val  
 225 230 235 240  
 Thr Pro Thr Thr Thr Ile Val Ile Asp Lys Gln Ser Val Ala Thr Ile  
 245 250 255  
 Lys Gly Gln Glu Ser Leu Ile Gly Asp Tyr Leu Asn Pro Gly Gly Thr  
 260 265 270  
 Tyr Pro Ile Ile Gly Glu Pro Pro Met Ala Leu Asn Thr Met Asp Gln  
 275 280 285  
 Phe Ser Ser Arg Leu Ile Pro Ile Asn Tyr Asn Gln Leu Lys Ser Ile  
 290 295 300  
 Asp Asn Gly Gly Thr Val Met Leu Ser Thr Ser Gln Phe Thr Gly Asn  
 305 310 315 320  
 Phe Ala Lys Tyr Asn Ser Asn Gly Asn Leu Val Thr Asp Gly Asn Asn  
 325 330 335  
 Trp Gly Pro Tyr Leu Gly Thr Ile Lys Ser Thr Thr Ala Ser Leu Thr  
 340 345 350  
 Leu Ser Phe Ser Gly Gln Thr Thr Gln Val Ala Val Val Ala Pro Asn  
 355 360 365  
 Phe Ser Asp Pro Glu Asp Lys Thr Pro Lys Leu Thr Leu Glu Gln Ala  
 370 375 380  
 Leu Val Lys Ala Phe Ala Leu Glu Lys Lys Asn Gly Lys Phe Tyr Phe  
 385 390 395 400  
 His Gly Leu Glu Ile Ser Lys Asn Glu Lys Ile Gln Val Phe Leu Asp  
 405 410 415  
 Ser Asn Thr Asn Asn Asp Phe Glu Asn Gln Leu Lys Asn Thr Ala Asp  
 420 425 430  
 Lys Asp Ile Met His Cys Ile Ile Lys Arg Asn Met Asn Ile Leu Val  
 435 440 445  
 Lys Val Ile Thr Phe Lys Glu Asn Ile Ser Ser Ile Asn Ile Ile Asn  
 450 455 460  
 Asp Thr Asn Phe Gly Val Gln Ser Met Thr Gly Leu Ser Asn Arg Ser  
 465 470 475 480  
 Lys Gly Gln Asp Gly Ile Tyr Arg Ala Ala Thr Thr Ala Phe Ser Phe  
 485 490 495  
 Lys Ser Lys Glu Leu Lys Tyr Pro Glu Gly Arg Tyr Arg Met Arg Phe  
 500 505 510  
 Val Ile Gln Ser Tyr Glu Pro Phe Thr Cys Asn Phe Lys Leu Phe Asn  
 515 520 525  
 Asn Leu Ile Tyr Ser Ser Ser Phe Asp Lys Gly Tyr Tyr Asp Glu Phe  
 530 535 540  
 Phe Tyr Phe Tyr Tyr Asn Gly Ser Lys Ser Phe Phe Asn Ile Ser Cys  
 545 550 555 560  
 Asp Ile Ile Asn Ser Ile Asn Arg Leu Ser Gly Val Phe Leu Ile Glu  
 565 570 575  
 Leu Asp Lys Leu Ile Ile  
 580

<210> 29  
 <211> 708  
 <212> PRT  
 <213> Bacillus cereus

<400> 29  
 Ile Asp Ser Gln Asn Gln Pro Gln Gln Val Gln Gln Asp Glu Leu Arg  
 1 5 10 15  
 Asn Pro Glu Phe Asn Lys Lys Glu Ser Gln Glu Phe Leu Ala Lys Pro  
 20 25 30  
 Ser Lys Ile Asn Leu Phe Thr Gln Met Lys Arg Glu Ile Asp Glu  
 35 40 45  
 Asp Thr Asp Thr Asp Gly Asp Ser Ile Pro Asp Leu Trp Glu Glu Asn  
 50 55 60  
 Gly Tyr Thr Ile Gln Asn Arg Ile Ala Val Lys Trp Asp Asp Ser Leu  
 65 70 75 80  
 Ala Ser Lys Gly Tyr Thr Lys Phe Val Ser Asn Pro Leu Glu Ser His  
 85 90 95  
 Thr Val Gly Asp Pro Tyr Thr Asp Tyr Glu Lys Ala Ala Arg Asp Leu  
 100 105 110  
 Asp Leu Ser Asn Ala Lys Glu Thr Phe Asn Pro Leu Val Ala Ala Phe  
 115 120 125  
 Pro Ser Val Asn Val Ser Met Glu Lys Val Ile Leu Ser Pro Asn Glu  
 130 135 140  
 Asn Leu Ser Asn Ser Val Glu Ser His Ser Ser Thr Asn Trp Ser Tyr  
 145 150 155 160  
 Thr Asn Thr Glu Gly Ala Ser Val Glu Ala Gly Ile Gly Pro Lys Gly  
 165 170 175  
 Ile Ser Phe Gly Val Ser Val Asn Tyr Gln His Ser Glu Thr Val Ala  
 180 185 190  
 Gln Glu Trp Gly Thr Ser Thr Gly Asn Thr Ser Gln Phe Asn Thr Ala  
 195 200 205  
 Ser Ala Gly Tyr Leu Asn Ala Asn Val Arg Tyr Asn Asn Val Gly Thr  
 210 215 220  
 Gly Ala Ile Tyr Asp Val Lys Pro Thr Thr Ser Phe Val Leu Asn Asn  
 225 230 235 240  
 Asp Thr Ile Ala Thr Ile Thr Ala Lys Ser Asn Ser Thr Ala Leu Asn  
 245 250 255  
 Ile Ser Pro Gly Glu Ser Tyr Pro Lys Lys Gly Gln Asn Gly Ile Ala  
 260 265 270  
 Ile Thr Ser Met Asp Asp Phe Asn Ser His Pro Ile Thr Leu Asn Lys  
 275 280 285  
 Lys Gln Val Asp Asn Leu Leu Asn Asn Lys Pro Met Met Leu Glu Thr  
 290 295 300  
 Asn Gln Thr Asp Gly Val Tyr Lys Ile Lys Asp Thr His Gly Asn Ile  
 305 310 315 320  
 Val Thr Gly Gly Glu Trp Asn Gly Val Ile Gln Gln Ile Lys Ala Lys  
 325 330 335  
 Thr Ala Ser Ile Ile Val Asp Asp Gly Glu Arg Val Ala Glu Lys Arg  
 340 345 350  
~~Val Ala Ala Lys Asp Tyr Glu Asn Pro Glu Asp Lys Thr Pro Ser Leu~~  
~~355 360 365~~  
 Thr Leu Lys Asp Ala Leu Lys Leu Ser Tyr Pro Asp Glu Ile Lys Glu  
 370 375 380  
 Ile Glu Gly Leu Leu Tyr Tyr Lys Asn Lys Pro Ile Tyr Glu Ser Ser  
 385 390 395 400  
 Val Met Thr Tyr Leu Asp Glu Asn Thr Ala Lys Glu Val Thr Lys Gln  
 405 410 415



Leu Asn Asp Thr Thr Gly Lys Phe Lys Asp Val Ser His Leu Tyr Asp  
 420 425 430  
 Val Lys Leu Thr Pro Lys Met Asn Val Thr Ile Lys Leu Ser Ile Leu  
 435 440 445  
 Tyr Asp Asn Ala Glu Ser Asn Asp Asn Ser Ile Gly Lys Trp Thr Asn  
 450 455 460  
 Thr Asn Ile Val Ser Gly Gly Asn Asn Gly Lys Lys Gln Tyr Ser Ser  
 465 470 475 480  
 Asn Asn Pro Asp Ala Asn Leu Thr Leu Asn Thr Asp Ala Gln Glu Lys  
 485 490 495  
 Leu Asn Lys Asn Arg Asp Tyr Tyr Ile Ser Leu Tyr Met Lys Ser Glu  
 500 505 510  
 Lys Asn Thr Gln Cys Glu Ile Thr Ile Asp Gly Glu Ile Tyr Pro Ile  
 515 520 525  
 Thr Thr Lys Thr Val Asn Val Asn Lys Asp Asn Tyr Lys Arg Leu Asp  
 530 535 540  
 Ile Ile Ala His Asn Ile Lys Ser Asn Pro Ile Ser Ser Leu His Ile  
 545 550 555 560  
 Lys Thr Asn Asp Glu Ile Thr Leu Phe Trp Asp Asp Ile Ser Ile Thr  
 565 570 575  
 Asp Val Ala Ser Ile Lys Pro Glu Asn Leu Thr Asp Ser Glu Ile Lys  
 580 585 590  
 Gln Ile Tyr Ser Arg Tyr Gly Ile Lys Leu Glu Asp Gly Ile Leu Ile  
 595 600 605  
 Asp Lys Lys Gly Gly Ile His Tyr Gly Glu Phe Ile Asn Glu Ala Ser  
 610 615 620  
 Phe Asn Ile Glu Pro Leu Gln Asn Tyr Val Thr Lys Tyr Glu Val Thr  
 625 630 635 640  
 Tyr Ser Ser Glu Leu Gly Pro Asn Val Ser Asp Thr Leu Glu Ser Asp  
 645 650 655  
 Lys Ile Tyr Lys Asp Gly Thr Ile Lys Phe Asp Phe Thr Lys Tyr Ser  
 660 665 670  
 Lys Asn Glu Gln Gly Leu Phe Tyr Asp Ser Gly Leu Asn Trp Asp Phe  
 675 680 685  
 Lys Ile Asn Ala Ile Thr Tyr Asp Gly Lys Glu Met Asn Val Phe His  
 690 695 700  
 Arg Tyr Asn Lys  
 705

<210> 30  
 <211> 735  
 <212> PRT  
 <213> Bacillus anthracis

<400> 30  
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser  
 1 5 10 15  
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro  
 20 25 30  
~~Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser~~  
~~35 40 45~~  
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile  
 50 55 60  
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala  
 65 70 75 80  
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val  
 85 90 95

Ile	Asn	Lys	Ala	Ser	Asn	Ser	Asn	Lys	Ile	Arg	Leu	Glu	Lys	Gly	Arg		
			100					105					110				
Leu	Tyr	Gln	Ile	Lys	Ile	Gln	Tyr	Gln	Arg	Glu	Asn	Pro	Thr	Glu	Lys		
		115						120				125					
Gly	Leu	Asp	Phe	Lys	Leu	Tyr	Trp	Thr	Asp	Ser	Gln	Asn	Lys	Lys	Glu		
	130						135					140					
Val	Ile	Ser	Ser	Asp	Asn	Leu	Gln	Leu	Pro	Glu	Leu	Lys	Gln	Lys	Ser		
145					150					155					160		
Ser	Asn	Ser	Arg	Lys	Lys	Arg	Ser	Thr	Ser	Ala	Gly	Pro	Thr	Val	Pro		
				165					170					175			
Asp	Arg	Asp	Asn	Asp	Gly	Ile	Pro	Asp	Ser	Leu	Glu	Val	Glu	Gly	Tyr		
			180					185					190				
Thr	Val	Asp	Val	Lys	Asn	Lys	Arg	Thr	Phe	Leu	Ser	Pro	Trp	Ile	Ser		
		195					200					205					
Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu		
	210					215						220					
Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr		
225					230					235					240		
Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val		
				245					250					255			
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser		
			260					265					270				
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Gln	Thr	Arg	Thr		
		275					280						285				
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His		
	290					295						300					
Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val		
305					310				315						320		
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His		
				325					330					335			
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu		
			340					345					350				
Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn		
		355					360						365				
Thr	Gly	Thr	Ala	Pro	Ile	Tyr	Asn	Val	Leu	Pro	Thr	Thr	Ser	Leu	Val		
	370					375						380					
Leu	Gly	Lys	Asn	Gln	Thr	Leu	Ala	Thr	Ile	Lys	Ala	Lys	Glu	Asn	Gln		
385					390					395					400		
Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu		
				405					410					415			
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Asp	Phe	Ser	Ser	Thr	Pro	Ile		
			420					425					430				
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu		
		435					440						445				
Arg	Leu	Asp	Thr	Asp	Gln	Val	Tyr	Gly	Asn	Ile	Ala	Thr	Tyr	Asn	Phe		
	450					455						460					
Glu	Asn	Gly	Arg	Val	Arg	Val	Asp	Thr	Gly	Ser	Asn	Trp	Ser	Glu	Val		
465					470					475					480		
Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys		
				485					490					495			
<del>Asp</del>	<del>Leu</del>	<del>Asn</del>	<del>Leu</del>	<del>Val</del>	<del>Glu</del>	<del>Arg</del>	<del>Arg</del>	<del>Ile</del>	<del>Ala</del>	<del>Ala</del>	<del>Val</del>	<del>Asn</del>	<del>Pro</del>	<del>Ser</del>	<del>Asp</del>		
			500					505					510				
Pro	Leu	Glu	Thr	Thr	Lys	Pro	Asp	Met	Thr	Leu	Lys	Glu	Ala	Leu	Lys		
		515						520					525				
Ile	Ala	Phe	Gly	Phe	Asn	Glu	Pro	Asn	Gly	Asn	Leu	Gln	Tyr	Gln	Gly		
	530						535					540					
Lys	Asp	Ile	Thr	Glu	Phe	Asp	Phe	Asn	Phe	Asp	Gln	Gln	Thr	Ser	Gln		
545					550					555					560		

Asn	Ile	Lys	Asn	Gln	Leu	Ala	Glu	Leu	Asn	Val	Thr	Asn	Ile	Tyr	Thr
				565					570					575	
Val	Leu	Asp	Lys	Ile	Lys	Leu	Asn	Ala	Lys	Met	Asn	Ile	Leu	Ile	Arg
			580					585					590		
Asp	Lys	Arg	Phe	His	Tyr	Asp	Arg	Asn	Asn	Ile	Ala	Val	Gly	Ala	Asp
		595					600					605			
Glu	Ser	Val	Val	Lys	Glu	Ala	His	Arg	Glu	Val	Ile	Asn	Ser	Ser	Thr
	610					615					620				
Glu	Gly	Leu	Leu	Leu	Asn	Ile	Asp	Lys	Asp	Ile	Arg	Lys	Ile	Leu	Ser
625					630					635					640
Gly	Tyr	Ile	Val	Glu	Ile	Glu	Asp	Thr	Glu	Gly	Leu	Lys	Glu	Val	Ile
			645						650					655	
Asn	Asp	Arg	Tyr	Asp	Met	Leu	Asn	Ile	Ser	Ser	Leu	Arg	Gln	Asp	Gly
			660					665					670		
Lys	Thr	Phe	Ile	Asp	Phe	Lys	Lys	Tyr	Asn	Asp	Lys	Leu	Pro	Leu	Tyr
		675					680					685			
Ile	Ser	Asn	Pro	Asn	Tyr	Lys	Val	Asn	Val	Tyr	Ala	Val	Thr	Lys	Glu
	690					695					700				
Asn	Thr	Ile	Ile	Asn	Pro	Ser	Glu	Asn	Gly	Asp	Thr	Ser	Thr	Asn	Gly
705				710					715						720
Ile	Lys	Lys	Ile	Leu	Ile	Phe	Ser	Lys	Lys	Gly	Tyr	Glu	Ile	Gly	
				725					730					735	

<210> 31  
 <211> 876  
 <212> PRT  
 <213> Clostridium difficile

<400> 31															
Met	Lys	Ile	Gln	Met	Arg	Asn	Lys	Lys	Val	Leu	Ser	Phe	Leu	Thr	Leu
1				5					10					15	
Thr	Ala	Ile	Val	Ser	Gln	Ala	Leu	Val	Tyr	Pro	Val	Tyr	Ala	Gln	Thr
			20					25					30		
Ser	Thr	Ser	Asn	His	Ser	Asn	Lys	Lys	Lys	Glu	Ile	Val	Asn	Glu	Asp
		35					40					45			
Ile	Leu	Pro	Asn	Asn	Gly	Leu	Met	Gly	Tyr	Tyr	Phe	Ser	Asp	Glu	His
	50					55					60				
Phe	Lys	Asp	Leu	Lys	Leu	Met	Ala	Pro	Ile	Lys	Asp	Gly	Asn	Leu	Lys
65					70					75				80	
Phe	Glu	Glu	Lys	Lys	Val	Asp	Lys	Leu	Leu	Asp	Lys	Asp	Lys	Ser	Asp
			85						90					95	
Val	Lys	Ser	Ile	Arg	Trp	Thr	Gly	Arg	Ile	Ile	Pro	Ser	Lys	Asp	Gly
			100					105					110		
Glu	Tyr	Thr	Leu	Ser	Thr	Asp	Arg	Asp	Asp	Val	Leu	Met	Gln	Val	Asn
		115					120					125			
Thr	Glu	Ser	Thr	Ile	Ser	Asn	Thr	Leu	Lys	Val	Asn	Met	Lys	Lys	Gly
	130					135					140				
Lys	Glu	Tyr	Lys	Val	Arg	Ile	Glu	Leu	Gln	Asp	Lys	Asn	Leu	Gly	Ser
145					150					155					160
Ile	Asp	Asn	Leu	Ser	Ser	Pro	Asn	Leu	Tyr	Trp	Glu	Leu	Asp	Gly	Met
			165						170				175		
Lys	Lys	Ile	Ile	Pro	Glu	Glu	Asn	Leu	Phe	Leu	Arg	Asp	Tyr	Ser	Asn
			180					185					190		
Ile	Glu	Lys	Asp	Asp	Pro	Phe	Ile	Pro	Asn	Asn	Asn	Phe	Phe	Asp	Pro
		195					200					205			
Lys	Leu	Met	Ser	Asp	Trp	Glu	Asp	Glu	Asp	Leu	Asp	Thr	Asp	Asn	Asp
	210					215					220				

Asn	Ile	Pro	Asp	Ser	Tyr	Glu	Arg	Asn	Gly	Tyr	Thr	Ile	Lys	Asp	Leu
225					230					235					240
Ile	Ala	Val	Lys	Trp	Glu	Asp	Ser	Phe	Ala	Glu	Gln	Gly	Tyr	Lys	Lys
			245						250					255	
Tyr	Val	Ser	Asn	Tyr	Leu	Glu	Ser	Asn	Thr	Ala	Gly	Asp	Pro	Tyr	Thr
			260					265					270		
Asp	Tyr	Glu	Lys	Ala	Ser	Gly	Ser	Phe	Asp	Lys	Ala	Ile	Lys	Thr	Glu
		275					280					285			
Ala	Arg	Asp	Pro	Leu	Val	Ala	Ala	Tyr	Pro	Ile	Val	Gly	Val	Gly	Met
	290					295					300				
Glu	Lys	Leu	Ile	Ile	Ser	Thr	Asn	Glu	His	Ala	Ser	Thr	Asp	Gln	Gly
305					310					315					320
Lys	Thr	Val	Ser	Arg	Ala	Thr	Thr	Asn	Ser	Lys	Thr	Glu	Ser	Asn	Thr
				325					330					335	
Ala	Gly	Val	Ser	Val	Asn	Val	Gly	Tyr	Gln	Asn	Gly	Phe	Thr	Ala	Asn
			340					345					350		
Val	Thr	Thr	Asn	Tyr	Ser	His	Thr	Thr	Asp	Asn	Ser	Thr	Ala	Val	Gln
		355					360					365			
Asp	Ser	Asn	Gly	Glu	Ser	Trp	Asn	Thr	Gly	Leu	Ser	Ile	Asn	Lys	Gly
	370					375					380				
Glu	Ser	Ala	Tyr	Ile	Asn	Ala	Asn	Val	Arg	Tyr	Tyr	Asn	Thr	Gly	Thr
385					390					395					400
Ala	Pro	Met	Tyr	Lys	Val	Thr	Pro	Thr	Thr	Asn	Leu	Val	Leu	Asp	Gly
			405						410					415	
Asp	Thr	Leu	Ser	Thr	Ile	Lys	Ala	Gln	Glu	Asn	Gln	Ile	Gly	Asn	Asn
		420					425						430		
Leu	Ser	Pro	Gly	Asp	Thr	Tyr	Pro	Lys	Lys	Gly	Leu	Ser	Pro	Leu	Ala
		435					440					445			
Leu	Asn	Thr	Met	Asp	Gln	Phe	Ser	Ser	Arg	Leu	Ile	Pro	Ile	Asn	Tyr
	450					455					460				
Asp	Gln	Leu	Lys	Lys	Leu	Asp	Ala	Gly	Lys	Gln	Ile	Lys	Leu	Glu	Thr
465					470					475					480
Thr	Gln	Val	Ser	Gly	Asn	Phe	Gly	Thr	Lys	Asn	Ser	Ser	Gly	Gln	Ile
				485					490					495	
Val	Thr	Glu	Gly	Asn	Ser	Trp	Ser	Asp	Tyr	Ile	Ser	Gln	Ile	Asp	Ser
		500						505					510		
Ile	Ser	Ala	Ser	Ile	Ile	Leu	Asp	Thr	Glu	Asn	Glu	Ser	Tyr	Glu	Arg
		515					520					525			
Arg	Val	Thr	Ala	Lys	Asn	Leu	Gln	Asp	Pro	Glu	Asp	Lys	Thr	Pro	Glu
	530					535					540				
Leu	Thr	Ile	Gly	Glu	Ala	Ile	Glu	Lys	Ala	Phe	Gly	Ala	Thr	Lys	Lys
545					550					555					560
Asp	Gly	Leu	Leu	Tyr	Phe	Asn	Asp	Ile	Pro	Ile	Asp	Glu	Ser	Cys	Val
				565					570					575	
Glu	Leu	Ile	Phe	Asp	Asp	Asn	Thr	Ala	Asn	Lys	Ile	Lys	Asp	Ser	Leu
			580					585					590		
Lys	Thr	Leu	Ser	Asp	Lys	Lys	Ile	Tyr	Asn	Val	Lys	Leu	Glu	Arg	Gly
		595					600					605			
Met	Asn	Ile	Leu	Ile	Lys	Thr	Pro	Thr	Tyr	Phe	Thr	Asn	Phe	Asp	Asp
	610					615					620				
Tyr	Asn	Asn	Tyr	Pro	Ser	Thr	Trp	Ser	Asn	Val	Asn	Thr	Thr	Asn	Gln
625					630					635					640
Asp	Gly	Leu	Gln	Gly	Ser	Ala	Asn	Lys	Leu	Asn	Gly	Glu	Thr	Lys	Ile
				645					650					655	
Lys	Ile	Pro	Met	Ser	Glu	Leu	Lys	Pro	Tyr	Lys	Arg	Tyr	Val	Phe	Ser
			660					665					670		
Gly	Tyr	Ser	Lys	Asp	Pro	Leu	Thr	Ser	Asn	Ser	Ile	Ile	Val	Lys	Ile
		675					680					685			

Lys Ala Lys Glu Glu Lys Thr Asp Tyr Leu Val Pro Glu Gln Gly Tyr  
 690 695 700  
 Thr Lys Phe Ser Tyr Glu Phe Glu Thr Thr Glu Lys Asp Ser Ser Asn  
 705 710 715 720  
 Ile Glu Ile Thr Leu Ile Gly Ser Gly Thr Thr Tyr Leu Asp Asn Leu  
 725 730 735  
 Ser Ile Thr Glu Leu Asn Ser Thr Pro Glu Ile Leu Asp Glu Pro Glu  
 740 745 750  
 Val Lys Ile Pro Thr Asp Gln Glu Ile Met Asp Ala His Lys Ile Tyr  
 755 760 765  
 Phe Ala Asp Leu Asn Phe Asn Pro Ser Thr Gly Asn Thr Tyr Ile Asn  
 770 775 780  
 Gly Met Tyr Phe Ala Pro Thr Gln Thr Asn Lys Glu Ala Leu Asp Tyr  
 785 790 795 800  
 Ile Gln Lys Tyr Arg Val Glu Ala Thr Leu Gln Tyr Ser Gly Phe Lys  
 805 810 815  
 Asp Ile Gly Thr Lys Asp Lys Glu Met Arg Asn Tyr Leu Gly Asp Pro  
 820 825 830  
 Asn Gln Pro Lys Thr Asn Tyr Val Asn Leu Arg Ser Tyr Phe Thr Gly  
 835 840 845  
 Gly Glu Asn Ile Met Thr Tyr Lys Lys Leu Arg Ile Tyr Ala Ile Thr  
 850 855 860  
 Pro Asp Asp Arg Glu Leu Leu Val Leu Ser Val Asp  
 865 870 875

<210> 32

<211> 875

<212> PRT

<213> Clostridium perfringens

<400> 32

Met Asn Ile Gln Ile Lys Asn Val Phe Ser Phe Leu Thr Leu Thr Ala  
 1 5 10 15  
 Met Ile Ser Gln Thr Leu Ser Tyr Asn Val Tyr Ala Gln Thr Thr Thr  
 20 25 30  
 Gln Asn Asp Thr Asn Gln Lys Glu Glu Ile Thr Asn Glu Asn Thr Leu  
 35 40 45  
 Ser Ser Asn Gly Leu Met Gly Tyr Tyr Phe Ala Asp Glu His Phe Lys  
 50 55 60  
 Asp Leu Glu Leu Met Ala Pro Ile Lys Asn Gly Asp Leu Lys Phe Glu  
 65 70 75 80  
 Glu Lys Lys Val Asp Lys Leu Leu Thr Glu Asp Asn Ser Ser Ile Lys  
 85 90 95  
 Ser Ile Arg Trp Thr Gly Arg Ile Ile Pro Ser Glu Asp Gly Glu Tyr  
 100 105 110  
 Ile Leu Ser Thr Asp Arg Asn Asp Val Leu Met Gln Ile Asn Ala Lys  
 115 120 125  
 Gly Asp Ile Ala Lys Thr Leu Lys Val Asn Met Lys Lys Gly Gln Ala  
 130 135 140  
~~Tyr Asn Ile Arg Ile Glu Ile Gln Asp Lys Asn Leu Gly Ser Ile Asp~~  
~~145 150 155 160~~  
 Asn Leu Ser Val Pro Lys Leu Tyr Trp Glu Leu Asn Gly Asn Lys Thr  
 165 170 175  
 Val Ile Pro Glu Glu Asn Leu Phe Phe Arg Asp Tyr Ser Lys Ile Asp  
 180 185 190  
 Glu Asn Asp Pro Phe Ile Pro Asn Asn Asn Phe Phe Asp Val Arg Phe  
 195 200 205

Phe Ser Ala Ala Trp Glu Asp Glu Asp Leu Asp Thr Asp Asn Asp Asn  
210 215 220  
Ile Pro Asp Ala Tyr Glu Lys Asn Gly Tyr Thr Ile Lys Asp Ser Ile  
225 230 235 240  
Ala Val Lys Trp Asn Asp Ser Phe Ala Glu Gln Gly Tyr Lys Lys Tyr  
245 250 255  
Val Ser Ser Tyr Leu Glu Ser Asn Thr Ala Gly Asp Pro Tyr Thr Asp  
260 265 270  
Tyr Gln Lys Ala Ser Gly Ser Ile Asp Lys Ala Ile Lys Leu Glu Ala  
275 280 285  
Arg Asp Pro Leu Val Ala Ala Tyr Pro Val Val Gly Val Gly Met Glu  
290 295 300  
Asn Leu Ile Ile Ser Thr Asn Glu His Ala Ser Ser Asp Gln Gly Lys  
305 310 315 320  
Thr Val Ser Arg Ala Thr Thr Asn Ser Lys Thr Asp Ala Asn Thr Val  
325 330 335  
Gly Val Ser Ile Ser Ala Gly Tyr Gln Asn Gly Phe Thr Gly Asn Ile  
340 345 350  
Thr Thr Ser Tyr Ser His Thr Thr Asp Asn Ser Thr Ala Val Gln Asp  
355 360 365  
Ser Asn Gly Glu Ser Trp Asn Thr Gly Leu Ser Ile Asn Lys Gly Glu  
370 375 380  
Ser Ala Tyr Ile Asn Ala Asn Val Arg Tyr Tyr Asn Thr Gly Thr Ala  
385 390 395 400  
Pro Met Tyr Lys Val Thr Pro Thr Thr Asn Leu Val Leu Asp Gly Glu  
405 410 415  
Thr Leu Ala Thr Ile Lys Ala Gln Asp Asn Gln Ile Gly Asn Asn Leu  
420 425 430  
Ser Pro Asn Glu Thr Tyr Pro Lys Lys Gly Leu Ser Pro Leu Ala Leu  
435 440 445  
Asn Thr Met Asp Gln Phe Asn Ala Arg Leu Ile Pro Ile Asn Tyr Asp  
450 455 460  
Gln Leu Lys Lys Leu Asp Ser Gly Lys Gln Ile Lys Leu Glu Thr Thr  
465 470 475 480  
Gln Val Ser Gly Asn Tyr Gly Thr Lys Asn Ser Gln Gly Gln Ile Ile  
485 490 495  
Thr Glu Gly Asn Ser Trp Ser Asn Tyr Ile Ser Gln Ile Asp Ser Val  
500 505 510  
Ser Ala Ser Ile Ile Leu Asp Thr Gly Ser Gln Thr Phe Glu Arg Arg  
515 520 525  
Val Ala Ala Lys Glu Gln Gly Asn Pro Glu Asp Lys Thr Pro Glu Ile  
530 535 540  
Thr Ile Gly Glu Ala Ile Lys Lys Ala Phe Ser Ala Thr Lys Asn Gly  
545 550 555 560  
Glu Leu Leu Tyr Phe Asn Gly Ile Pro Ile Asp Glu Ser Cys Val Glu  
565 570 575  
Leu Ile Phe Asp Asp Asn Thr Ser Glu Ile Ile Lys Glu Gln Leu Lys  
580 585 590  
Tyr Leu Asp Asp Lys Lys Ile Tyr Asn Val Lys Leu Glu Arg Gly Met  
595 600 605  
Asn Ile Leu Ile Lys Val Pro Ser Tyr Phe Thr Asn Phe Asp Glu Tyr  
610 615 620  
Asn Asn Phe Pro Ala Ser Trp Ser Asn Ile Asp Thr Lys Asn Gln Asp  
625 630 635 640  
Gly Leu Gln Ser Val Ala Asn Lys Leu Ser Gly Glu Thr Lys Ile Ile  
645 650 655  
Ile Pro Met Ser Lys Leu Lys Pro Tyr Lys Arg Tyr Val Phe Ser Gly  
660 665 670

Tyr	Ser	Lys	Asp	Pro	Ser	Thr	Ser	Asn	Ser	Ile	Thr	Val	Asn	Ile	Lys
		675					680					685			
Ser	Lys	Glu	Gln	Lys	Thr	Asp	Tyr	Leu	Val	Pro	Glu	Lys	Asp	Tyr	Thr
		690				695					700				
Lys	Phe	Ser	Tyr	Glu	Phe	Glu	Thr	Thr	Gly	Lys	Asp	Ser	Ser	Asp	Ile
705					710					715					720
Glu	Ile	Thr	Leu	Thr	Ser	Ser	Gly	Val	Ile	Phe	Leu	Asp	Asn	Leu	Ser
				725						730				735	
Ile	Thr	Glu	Leu	Asn	Ser	Thr	Pro	Glu	Ile	Leu	Lys	Glu	Pro	Glu	Ile
			740					745					750		
Lys	Val	Pro	Ser	Asp	Gln	Glu	Ile	Leu	Asp	Ala	His	Asn	Lys	Tyr	Tyr
		755					760					765			
Ala	Asp	Ile	Lys	Leu	Asp	Thr	Asn	Thr	Gly	Asn	Thr	Tyr	Ile	Asp	Gly
		770				775					780				
Ile	Tyr	Phe	Glu	Pro	Thr	Gln	Thr	Asn	Lys	Glu	Ala	Leu	Asp	Tyr	Ile
785					790					795					800
Gln	Lys	Tyr	Arg	Val	Glu	Ala	Thr	Leu	Gln	Tyr	Ser	Gly	Phe	Lys	Asp
				805					810					815	
Ile	Gly	Thr	Lys	Asp	Lys	Glu	Ile	Arg	Asn	Tyr	Leu	Gly	Asp	Gln	Asn
			820					825					830		
Gln	Pro	Lys	Thr	Asn	Tyr	Ile	Asn	Phe	Arg	Ser	Tyr	Phe	Thr	Ser	Gly
		835					840					845			
Glu	Asn	Val	Met	Thr	Tyr	Lys	Lys	Leu	Arg	Ile	Tyr	Ala	Val	Thr	Pro
	850					855					860				
Asp	Asn	Arg	Glu	Leu	Leu	Val	Leu	Ser	Val	Asn					
865					870					875					

<210> 33

<211> 879

<212> PRT

<213> Clostridium spiroforme

<400> 33

Met	Lys	Asn	Lys	Lys	Ile	Leu	Gly	Leu	Leu	Thr	Cys	Thr	Val	Leu	Val
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Gly	Gln	Met	Met	Thr	Tyr	Pro	Val	Tyr	Ala	Lys	Thr	Ile	Thr	Gln	Asn
		20						25					30		
Tyr	Asp	Asn	Gln	Glu	Val	Glu	Thr	Thr	Asn	Glu	Lys	Thr	Val	Ser	Ser
		35					40					45			
Asn	Gly	Leu	Met	Gly	Tyr	Tyr	Phe	Ala	Asp	Glu	His	Phe	Lys	Asp	Leu
	50					55					60				
Glu	Leu	Met	Ala	Pro	Val	Lys	Asn	Gly	Glu	Leu	Lys	Phe	Glu	Lys	Asn
65					70					75					80
Lys	Val	Glu	Lys	Leu	Leu	Thr	Glu	Glu	Lys	Thr	Asn	Ile	Lys	Ser	Ile
				85					90					95	
Arg	Trp	Thr	Gly	Arg	Ile	Ile	Pro	Ser	Lys	Asp	Gly	Glu	Tyr	Thr	Leu
		100						105					110		
Ser	Thr	Asp	Lys	Asp	Asn	Val	Leu	Met	Gln	Ile	Asn	Ala	Glu	Gly	Glu
		115					120					125			
Ile	Ala	Asn	Thr	Leu	Lys	Val	Asn	Met	Ile	Lys	Gly	Gln	Glu	Tyr	Ser
	130					135					140				
Ile	Arg	Ile	Glu	Ile	Gln	Asp	Lys	Asp	Ile	Gly	Tyr	Val	Asp	Asp	Leu
145					150					155					160
Ser	Ser	Pro	Lys	Leu	Tyr	Trp	Glu	Leu	Asn	Gly	Asp	Lys	Thr	Leu	Ile
				165						170				175	
Pro	Glu	Lys	Asn	Leu	Phe	Leu	Arg	Asp	Tyr	Ser	Lys	Ile	Asp	Glu	Asn
			180					185						190	

Asp	Pro	Phe	Ile	Pro	Lys	Asp	Asn	Phe	Phe	Asp	Leu	Lys	Leu	Lys	Ser
		195					200					205			
Arg	Ser	Ala	Arg	Leu	Ala	Ser	Gly	Trp	Gly	Asp	Glu	Asp	Leu	Asp	Thr
	210					215				220					
Asp	Asn	Asp	Asn	Ile	Pro	Asp	Ala	Tyr	Glu	Lys	Asn	Gly	Tyr	Thr	Ile
225				230						235					240
Lys	Asp	Ser	Ile	Ala	Val	Lys	Trp	Glu	Asp	Ser	Phe	Ala	Gln	Gln	Gly
			245					250						255	
Tyr	Lys	Lys	Tyr	Leu	Ser	Ser	Tyr	Leu	Glu	Ser	Asn	Thr	Ala	Gly	Asp
			260					265					270		
Pro	Tyr	Thr	Asp	Tyr	Gln	Lys	Ala	Ser	Gly	Ser	Phe	Asp	Lys	Ala	Ile
	275						280					285			
Lys	Ala	Glu	Ala	Arg	Asp	Pro	Leu	Val	Ala	Ala	Tyr	Pro	Val	Val	Gly
	290					295					300				
Val	Gly	Met	Glu	Lys	Leu	Ile	Ile	Ser	Thr	Asn	Glu	His	Ala	Ser	Thr
305					310					315					320
Asp	Gln	Gly	Lys	Thr	Val	Ser	Arg	Asn	Thr	Thr	Asn	Ser	Lys	Thr	Asp
			325					330						335	
Ala	Asn	Thr	Ala	Gly	Val	Ala	Ile	Asn	Ile	Ala	Tyr	Gln	Asn	Gly	Phe
			340					345					350		
Thr	Gly	Ser	Ile	Thr	Thr	Asn	Tyr	Ser	His	Thr	Thr	Glu	Asn	Ser	Thr
		355					360					365			
Ala	Val	Gln	Asn	Ser	Asn	Gly	Glu	Ser	Trp	Asn	Thr	Ser	Leu	Ser	Ile
	370					375					380				
Asn	Lys	Gly	Glu	Ser	Ala	Tyr	Ile	Asn	Ala	Asn	Val	Arg	Tyr	Tyr	Asn
385					390					395					400
Thr	Gly	Thr	Ala	Pro	Met	Tyr	Lys	Val	Thr	Pro	Thr	Thr	Asn	Leu	Val
			405					410					415		
Leu	Asp	Gly	Asp	Thr	Leu	Thr	Thr	Ile	Lys	Ala	Gln	Asp	Asn	Gln	Ile
			420					425					430		
Gly	Asn	Asn	Leu	Ser	Pro	Asn	Glu	Thr	Tyr	Pro	Lys	Lys	Gly	Leu	Ser
		435					440					445			
Pro	Leu	Ala	Leu	Asn	Thr	Met	Asp	Gln	Phe	Ser	Ser	Arg	Leu	Ile	Pro
	450					455					460				
Ile	Asn	Tyr	Asp	Gln	Leu	Lys	Lys	Leu	Asp	Ala	Gly	Lys	Gln	Ile	Lys
465					470					475					480
Leu	Glu	Thr	Thr	Gln	Val	Ser	Gly	Asn	Tyr	Gly	Ile	Lys	Asn	Ser	Gln
			485					490					495		
Gly	Gln	Ile	Ile	Thr	Glu	Gly	Asn	Ser	Trp	Ser	Asp	Tyr	Ile	Ser	Gln
		500					505						510		
Ile	Asp	Ser	Leu	Ser	Ala	Ser	Ile	Ile	Leu	Asp	Thr	Gly	Ser	Asp	Val
	515						520					525			
Phe	Glu	Arg	Arg	Val	Thr	Ala	Lys	Asp	Ser	Ser	Asn	Pro	Glu	Asp	Lys
	530					535					540				
Thr	Pro	Val	Leu	Thr	Ile	Gly	Glu	Ala	Ile	Glu	Lys	Ala	Phe	Gly	Ala
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Thr	Lys	Asn	Gly	Glu	Ile	Leu	Tyr	Phe	Asn	Gly	Met	Pro	Ile	Asp	Glu
			565					570					575		
Ser	Cys	Val	Glu	Leu	Ile	Phe	Asp	Gly	Asn	Thr	Ala	Asn	Leu	Ile	Lys
			580					585					590		
Glu	Arg	Leu	Asn	Ala	Leu	Asn	Asp	Lys	Lys	Ile	Tyr	Asn	Val	Gln	Leu
		595					600					605			
Glu	Arg	Gly	Met	Lys	Ile	Leu	Ile	Lys	Thr	Ser	Thr	Tyr	Phe	Asn	Asn
	610					615					620				
Phe	Asp	Gly	Tyr	Asn	Asn	Phe	Pro	Ser	Ser	Trp	Ser	Asn	Val	Asp	Ser
625					630					635					640
Asn	Asn	Gln	Asp	Gly	Leu	Gln	Asn	Ala	Ala	Asn	Lys	Leu	Ser	Gly	Glu
				645				650						655	



Thr	Lys	Ile	Val	Ile	Pro	Met	Ser	Lys	Leu	Asn	Pro	Tyr	Lys	Arg	Tyr
			660					665					670		
Val	Phe	Ser	Gly	Tyr	Leu	Lys	Asn	Ser	Ser	Thr	Ser	Asn	Pro	Ile	Thr
			675					680					685		
Val	Asn	Ile	Lys	Ala	Lys	Glu	Gln	Lys	Thr	Tyr	Asn	Leu	Val	Ser	Glu
			690					695				700			
Asn	Asp	Tyr	Lys	Lys	Phe	Ser	Tyr	Glu	Phe	Glu	Thr	Ile	Gly	Arg	Asp
705					710					715				720	
Ala	Ser	Asn	Ile	Glu	Ile	Thr	Leu	Thr	Ser	Ser	Gly	Thr	Ile	Phe	Leu
				725						730				735	
Asp	Asn	Leu	Ser	Ile	Thr	Glu	Leu	Asn	Ser	Thr	Pro	Glu	Ile	Leu	Lys
				740						745				750	
Glu	Pro	Asp	Ile	Lys	Val	Pro	Ser	Asp	Gln	Glu	Ile	Ile	Asp	Ala	His
				755						760				765	
Lys	Lys	Tyr	Tyr	Ala	Asp	Leu	Ser	Phe	Asn	Gln	Ser	Thr	Ala	Asn	Tyr
				770				775					780		
Tyr	Leu	Asp	Gly	Leu	Tyr	Phe	Glu	Pro	Thr	Gln	Thr	Asn	Lys	Glu	Val
785					790					795					800
Leu	Asp	Tyr	Ile	Gln	Lys	Tyr	Lys	Val	Glu	Ala	Thr	Leu	Glu	Tyr	Ser
				805						810				815	
Gly	Phe	Lys	Asp	Ile	Gly	Thr	Lys	Asp	Lys	Glu	Leu	Arg	Asn	Tyr	Thr
				820						825				830	
Gly	Asp	Ser	Asn	Gln	Pro	Lys	Thr	Asn	Tyr	Val	Asn	Phe	Arg	Ser	Tyr
				835						840				845	
Phe	Thr	Ser	Gly	Glu	Asn	Val	Met	Pro	Tyr	Lys	Lys	Leu	Arg	Ile	Tyr
				850						855				860	
Ala	Ile	Thr	Pro	Glu	Asn	Lys	Glu	Leu	Leu	Val	Leu	Ser	Ile	Asn	
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 <212> PRT  
 <213> Clostridium botulinum

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Tyr	Phe	Thr	Ile	Asn	Gly	Leu	Met	Gly	Tyr	Tyr	Phe	Glu	Asn	Asp	Phe
			20					25					30		
Phe	Asn	Leu	Asn	Ile	Ile	Ser	Pro	Thr	Leu	Asp	Gly	Asn	Leu	Thr	Phe
			35					40					45		
Ser	Lys	Glu	Asp	Ile	Asn	Ser	Ile	Leu	Gly	Asn	Lys	Ile	Ile	Lys	Ser
			50					55				60			
Ala	Arg	Trp	Ile	Gly	Leu	Ile	Lys	Pro	Ser	Ile	Thr	Gly	Glu	Tyr	Ile
65					70					75					80
Leu	Ser	Thr	Asn	Ser	Pro	Asn	Cys	Arg	Val	Glu	Leu	Asn	Gly	Glu	Ile
				85					90					95	
Phe	Asn	Leu	Ser	Leu	Asn	Thr	Ser	Asn	Thr	Val	Asn	Leu	Ile	Gln	Gly
				100					105					110	
<del>Asn</del>	<del>Val</del>	<del>Tyr</del>	<del>Asp</del>	<del>Ile</del>	<del>Arg</del>	<del>Ile</del>	<del>Glu</del>	<del>Gln</del>	<del>Leu</del>	<del>Met</del>	<del>Ser</del>	<del>Glu</del>	<del>Asn</del>	<del>Gln</del>	<del>Leu</del>
				115					120					125	
Leu	Lys	Asn	Tyr	Glu	Gly	Ile	Lys	Leu	Tyr	Trp	Glu	Thr	Ser	Asp	Ile
				130								140			
Ile	Lys	Glu	Ile	Ile	Pro	Ser	Glu	Val	Leu	Leu	Lys	Pro	Asn	Tyr	Ser
145					150					155					160
Asn	Thr	Asn	Glu	Lys	Ser	Lys	Phe	Ile	Pro	Asn	Asn	Thr	Leu	Phe	Ser
				165						170					175

Asn Ala Lys Leu Lys Ala Asn Ala Asn Arg Asp Thr Asp Arg Asp Gly  
 180 185 190  
 Ile Pro Asp Glu Trp Glu Ile Asn Gly Tyr Thr Val Met Asn Gln Lys  
 195 200 205  
 Ala Val Ala Trp Asp Asp Lys Phe Ala Ala Asn Gly Tyr Lys Lys Tyr  
 210 215 220  
 Val Ser Asn Pro Phe Lys Pro Cys Thr Ala Asn Asp Pro Tyr Thr Asp  
 225 230 235 240  
 Phe Glu Lys Val Ser Gly Gln Ile Asp Pro Ser Val Ser Met Val Ala  
 245 250 255  
 Arg Asp Pro Met Ile Ser Ala Tyr Pro Ile Val Gly Val Gln Met Glu  
 260 265 270  
 Arg Leu Val Val Ser Lys Ser Glu Thr Ile Thr Gly Asp Ser Thr Lys  
 275 280 285  
 Ser Met Ser Lys Ser Thr Ser His Ser Ser Thr Asn Ile Asn Thr Val  
 290 295 300  
 Gly Ala Glu Val Ser Gly Ser Leu Gln Leu Ala Gly Gly Ile Phe Pro  
 305 310 315 320  
 Val Phe Ser Met Ser Ala Ser Ala Asn Tyr Ser His Thr Trp Gln Asn  
 325 330 335  
 Thr Ser Thr Val Asp Asp Thr Thr Gly Glu Ser Phe Ser Gln Gly Leu  
 340 345 350  
 Ser Ile Asn Thr Gly Glu Ser Ala Tyr Ile Asn Pro Asn Ile Arg Tyr  
 355 360 365  
 Tyr Asn Thr Gly Thr Ala Pro Val Tyr Asn Val Thr Pro Thr Thr Thr  
 370 375 380  
 Ile Val Ile Asp Lys Gln Ser Val Ala Thr Ile Lys Gly Gln Glu Ser  
 385 390 395 400  
 Leu Ile Gly Asp Tyr Leu Asn Pro Gly Gly Thr Tyr Pro Ile Ile Gly  
 405 410 415  
 Glu Pro Pro Met Ala Leu Asn Thr Met Asp Gln Phe Ser Ser Arg Leu  
 420 425 430  
 Ile Pro Ile Asn Tyr Asn Gln Leu Lys Ser Ile Asp Asn Gly Gly Thr  
 435 440 445  
 Val Met Leu Ser Thr Ser Gln Phe Thr Gly Asn Phe Ala Lys Tyr Asn  
 450 455 460  
 Ser Asn Gly Asn Leu Val Thr Asp Gly Asn Asn Trp Gly Pro Tyr Leu  
 465 470 475 480  
 Gly Thr Ile Lys Ser Thr Thr Ala Ser Leu Thr Leu Ser Phe Ser Gly  
 485 490 495  
 Gln Thr Thr Gln Val Ala Val Val Ala Pro Asn Phe Ser Asp Pro Glu  
 500 505 510  
 Asp Lys Thr Pro Lys Leu Thr Leu Glu Gln Ala Leu Val Lys Ala Phe  
 515 520 525  
 Ala Leu Glu Lys Lys Asn Gly Lys Phe Tyr Phe His Gly Leu Glu Ile  
 530 535 540  
 Ser Lys Asn Glu Lys Ile Gln Val Phe Leu Asp Ser Asn Thr Asn Asn  
 545 550 555 560  
 Asp Phe Glu Asn Gln Leu Lys Asn Thr Ala Asp Lys Asp Ile Met His  
 565 570 575  
 Cys Ile Ile Lys Arg Asn Met Asn Ile Leu Val Lys Val Ile Thr Phe  
 580 585 590  
 Lys Glu Asn Ile Ser Ser Ile Asn Ile Ile Asn Asp Thr Asn Phe Gly  
 595 600 605  
 Val Gln Ser Met Thr Gly Leu Ser Asn Arg Ser Lys Gly Gln Asp Gly  
 610 615 620  
 Ile Tyr Arg Ala Ala Thr Thr Ala Phe Ser Phe Lys Ser Lys Glu Leu  
 625 630 635 640

Lys Tyr Pro Glu Gly Arg Tyr Arg Met Arg Phe Val Ile Gln Ser Tyr  
 645 650 655  
 Glu Pro Phe Thr Cys Asn Phe Lys Leu Phe Asn Asn Leu Ile Tyr Ser  
 660 665 670  
 Ser Ser Phe Asp Lys Gly Tyr Tyr Asp Glu Phe Phe Tyr Phe Tyr Tyr  
 675 680 685  
 Asn Gly Ser Lys Ser Phe Phe Asn Ile Ser Cys Asp Ile Ile Asn Ser  
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 Ile

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 Leu Asn Asn Glu Val Ile Lys Ala Glu Gln Leu Asn Ile Asn Ser Gln  
 35 40 45  
 Ser Lys Tyr Thr Asn Leu Gln Asn Leu Lys Ile Thr Asp Lys Val Glu  
 50 55 60  
 Asp Phe Lys Glu Asp Lys Glu Lys Ala Lys Glu Trp Gly Lys Glu Lys  
 65 70 75 80  
 Glu Lys Glu Trp Lys Leu Thr Ala Thr Glu Lys Gly Lys Met Asn Asn  
 85 90 95  
 Phe Leu Asp Asn Lys Asn Asp Ile Lys Thr Asn Tyr Lys Glu Ile Thr  
 100 105 110  
 Phe Ser Ile Ala Gly Ser Phe Glu Asp Glu Ile Lys Asp Leu Lys Glu  
 115 120 125  
 Ile Asp Lys Met Phe Asp Lys Thr Asn Leu Ser Asn Ser Ile Ile Thr  
 130 135 140  
 Tyr Lys Asn Val Glu Pro Thr Thr Ile Gly Phe Asn Lys Ser Leu Thr  
 145 150 155 160  
 Glu Gly Asn Thr Ile Asn Ser Asp Ala Met Ala Gln Phe Lys Glu Gln  
 165 170 175  
 Phe Leu Asp Arg Asp Ile Lys Phe Asp Ser Tyr Leu Asp Thr His Leu  
 180 185 190  
 Thr Ala Gln Gln Val Ser Ser Lys Glu Arg Val Ile Leu Lys Val Thr  
 195 200 205  
 Val Pro Ser Gly Lys Gly Ser Thr Thr Pro Thr Lys Ala Gly Val Ile  
 210 215 220  
 Leu Asn Asn Ser Glu Tyr Lys Met Leu Ile Asp Asn Gly Tyr Met Val  
 225 230 235 240  
 His Val Asp Lys Val Ser Lys Val Val Lys Lys Gly Val Glu Cys Leu  
 245 250 255  
 Gln Ile Glu Gly Thr Leu Lys Lys Ser Leu Asp Phe Lys Asn Asp Ile  
 260 265 270  
 Asn Ala Glu Ala His Ser Trp Gly Met Lys Asn Tyr Glu Glu Trp Ala  
 275 280 285  
 Lys Asp Leu Thr Asp Ser Gln Arg Glu Ala Leu Asp Gly Tyr Ala Arg  
 290 295 300

Gln Asp Tyr Lys Glu Ile Asn Asn Tyr Leu Arg Asn Gln Gly Gly Ser  
 305 310 315 320  
 Gly Asn Glu Lys Leu Asp Ala Gln Ile Lys Asn Ile Ser Asp Ala Leu  
 325 330 335  
 Gly Lys Lys Pro Ile Pro Glu Asn Ile Thr Val Tyr Arg Trp Cys Gly  
 340 345 350  
 Met Pro Glu Phe Gly Tyr Gln Ile Ser Asp Pro Leu Pro Ser Leu Lys  
 355 360 365  
 Asp Phe Glu Glu Gln Phe Leu Asn Thr Ile Lys Glu Asp Lys Gly Tyr  
 370 375 380  
 Met Ser Thr Ser Leu Ser Ser Glu Arg Leu Ala Ala Phe Gly Ser Arg  
 385 390 395 400  
 Lys Ile Ile Leu Arg Leu Gln Val Pro Lys Gly Ser Thr Gly Ala Tyr  
 405 410 415  
 Leu Ser Ala Ile Gly Gly Phe Ala Ser Glu Lys Glu Ile Leu Leu Asp  
 420 425 430  
 Lys Asp Ser Lys Tyr His Ile Asp Lys Val Thr Glu Val Ile Ile Lys  
 435 440 445  
 Gly Val Lys Arg Tyr Val Val Asp Ala Thr Leu Leu Thr Asn Ser Arg  
 450 455 460  
 Gly Pro Ser Thr Pro Pro Thr Pro Ser Pro Thr Pro Pro Thr Pro  
 465 470 475 480  
 Ser Asp Ile Gly Ser Thr Met Lys Thr Asn Gln Ile Ser Thr Thr Gln  
 485 490 495  
 Lys Asn Gln Gln Lys Glu Met Asp Arg Lys Gly Leu Leu Gly Tyr Tyr  
 500 505 510  
 Phe Lys Gly Lys Asp Phe Ser Asn Leu Thr Met Phe Ala Pro Thr Arg  
 515 520 525  
 Asp Ser Thr Leu Ile Tyr Asp Gln Gln Thr Ala Asn Lys Leu Leu Asp  
 530 535 540  
 Lys Lys Gln Gln Glu Tyr Gln Ser Ile Arg Trp Ile Gly Leu Ile Gln  
 545 550 555 560  
 Ser Lys Glu Thr Gly Asp Phe Thr Phe Asn Leu Ser Glu Asp Glu Gln  
 565 570 575  
 Ala Ile Ile Glu Ile Asn Gly Lys Ile Ile Ser Asn Lys Gly Lys Glu  
 580 585 590  
 Lys Gln Val Val His Leu Glu Lys Gly Lys Leu Val Pro Ile Lys Ile  
 595 600 605  
 Glu Tyr Gln Ser Asp Thr Lys Phe Asn Ile Asp Ser Lys Thr Phe Lys  
 610 615 620  
 Glu Leu Lys Leu Phe Lys Ile Asp Ser Gln Asn Gln Pro Gln Gln Val  
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 Gln Gln Asp Glu Leu Arg Asn Pro Glu Phe Asn Lys Lys Glu Ser Gln  
 645 650 655  
 Glu Phe Leu Ala Lys Pro Ser Lys Ile Asn Leu Phe Thr Gln Gln Met  
 660 665 670  
 Lys Arg Glu Ile Asp Glu Asp Thr Asp Thr Asp Gly Asp Ser Ile Pro  
 675 680 685  
 Asp Leu Trp Glu Glu Asn Gly Tyr Thr Ile Gln Asn Arg Ile Ala Val  
 690 695 700  
 Lys Trp Asp Asp Ser Leu Ala Ser Lys Gly Tyr Thr Lys Phe Val Ser  
 705 710 715 720  
 Asn Pro Leu Glu Ser His Thr Val Gly Asp Pro Tyr Thr Asp Tyr Glu  
 725 730 735  
 Lys Ala Ala Arg Asp Leu Asp Leu Ser Asn Ala Lys Glu Thr Phe Asn  
 740 745 750  
 Pro Leu Val Ala Ala Phe Pro Ser Val Asn Val Ser Met Glu Lys Val  
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Ile Leu Ser Pro Asn Glu Asn Leu Ser Asn Ser Val Glu Ser His Ser  
 770 775 780  
 Ser Thr Asn Trp Ser Tyr Thr Asn Thr Glu Gly Ala Ser Val Glu Ala  
 785 790 795 800  
 Gly Ile Gly Pro Lys Gly Ile Ser Phe Gly Val Ser Val Asn Tyr Gln  
 805 810 815  
 His Ser Glu Thr Val Ala Gln Glu Trp Gly Thr Ser Thr Gly Asn Thr  
 820 825 830  
 Ser Gln Phe Asn Thr Ala Ser Ala Gly Tyr Leu Asn Ala Asn Val Arg  
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 Tyr Asn Asn Val Gly Thr Gly Ala Ile Tyr Asp Val Lys Pro Thr Thr  
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 Ser Phe Val Leu Asn Asn Asp Thr Ile Ala Thr Ile Thr Ala Lys Ser  
 865 870 875 880  
 Asn Ser Thr Ala Leu Asn Ile Ser Pro Gly Glu Ser Tyr Pro Lys Lys  
 885 890 895  
 Gly Gln Asn Gly Ile Ala Ile Thr Ser Met Asp Asp Phe Asn Ser His  
 900 905 910  
 Pro Ile Thr Leu Asn Lys Lys Gln Val Asp Asn Leu Leu Asn Asn Lys  
 915 920 925  
 Pro Met Met Leu Glu Thr Asn Gln Thr Asp Gly Val Tyr Lys Ile Lys  
 930 935 940  
 Asp Thr His Gly Asn Ile Val Thr Gly Gly Glu Trp Asn Gly Val Ile  
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 Gln Gln Ile Lys Ala Lys Thr Ala Ser Ile Ile Val Asp Asp Gly Glu  
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 Arg Val Ala Glu Lys Arg Val Ala Ala Lys Asp Tyr Glu Asn Pro Glu  
 980 985 990  
 Asp Lys Thr Pro Ser Leu Thr Leu Lys Asp Ala Leu Lys Leu Ser Tyr  
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 Pro Asp Glu Ile Lys Glu Ile Glu Gly Leu Leu Tyr Tyr Lys Asn Lys  
 1010 1015 1020  
 Pro Ile Tyr Glu Ser Ser Val Met Thr Tyr Leu Asp Glu Asn Thr Ala  
 1025 1030 1035 1040  
 Lys Glu Val Thr Lys Gln Leu Asn Asp Thr Thr Gly Lys Phe Lys Asp  
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 Val Ser His Leu Tyr Asp Val Lys Leu Thr Pro Lys Met Asn Val Thr  
 1060 1065 1070  
 Ile Lys Leu Ser Ile Leu Tyr Asp Asn Ala Glu Ser Asn Asp Asn Ser  
 1075 1080 1085  
 Ile Gly Lys Trp Thr Asn Thr Asn Ile Val Ser Gly Gly Asn Asn Gly  
 1090 1095 1100  
 Lys Lys Gln Tyr Ser Ser Asn Asn Pro Asp Ala Asn Leu Thr Leu Asn  
 1105 1110 1115 1120  
 Thr Asp Ala Gln Glu Lys Leu Asn Lys Asn Arg Asp Tyr Tyr Ile Ser  
 1125 1130 1135  
 Leu Tyr Met Lys Ser Glu Lys Asn Thr Gln Cys Glu Ile Thr Ile Asp  
 1140 1145 1150  
 Gly Glu Ile Tyr Pro Ile Thr Thr Lys Thr Val Asn Val Asn Lys Asp  
 1155 1160 1165  
 Asn Tyr Lys Arg Leu Asp Ile Ile Ala His Asn Ile Lys Ser Asn Pro  
 1170 1175 1180  
 Ile Ser Ser Leu His Ile Lys Thr Asn Asp Glu Ile Thr Leu Phe Trp  
 1185 1190 1195 1200  
 Asp Asp Ile Ser Ile Thr Asp Val Ala Ser Ile Lys Pro Glu Asn Leu  
 1205 1210 1215  
 Thr Asp Ser Glu Ile Lys Gln Ile Tyr Ser Arg Tyr Gly Ile Lys Leu  
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Glu Asp Gly Ile Leu Ile Asp Lys Lys Gly Gly Ile His Tyr Gly Glu  
 1235  
 Phe Ile Asn Glu Ala Ser Phe Asn Ile Glu Pro Leu Gln Asn Tyr Val  
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 Thr Lys Tyr Glu Val Thr Tyr Ser Ser Glu Leu Gly Pro Asn Val Ser  
 1265  
 Asp Thr Leu Glu Ser Asp Lys Ile Tyr Lys Asp Gly Thr Ile Lys Phe  
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 Asp Phe Thr Lys Tyr Ser Lys Asn Glu Gln Gly Leu Phe Tyr Asp Ser  
 1300  
 Gly Leu Asn Trp Asp Phe Lys Ile Asn Ala Ile Thr Tyr Asp Gly Lys  
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 Glu Met Asn Val Phe His Arg Tyr Asn Lys  
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